16 SOURCES x 16 DISPLAYS | Modular Matrix

GEF-MOD-16416-DVI • GEF-MOD-16416-DVIELR
GEF-MOD-16416-ELR • GEF-MOD-16416-DVI1FO
GEF-MOD-16416-1FO • GEF-MOD-16416-DPDVI
GEF-MOD-16416-DPELR • GEF-MOD-16416-DP1FO

User Manual

Release A5

GefenPRO®

Important Safety Instructions

GENERAL SAFETY INFORMATION

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this product near water.
6. Clean only with a dry cloth.
7. Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
8. Do not install or place this product near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
9. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
10. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
11. Only use attachments/accessories specified by the manufacturer.
12. To reduce the risk of electric shock and/or damage to this product, never handle or touch this unit or power cord if your hands are wet or damp. Do not expose this product to rain or moisture.
13. Unplug this apparatus during lightning storms or when unused for long periods of time.
14. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
15. Batteries that may be included with this product and/or accessories should never be exposed to open flame or excessive heat. Always dispose of used batteries according to the instructions.

RACK MOUNT SAFETY INFORMATION

a. Maximum recommended ambient temperature: 40 ˚C (104 ˚F).

b. Increase the air flow as needed to maintain the recommended temperature inside the rack.

c. Do not exceed maximum weight loads for the rack. Install heavier equipment in the lower part of the rack to maintain stability.

Warranty Information

Gefen warrants the equipment it manufactures to be free from defects in material and workmanship.

If equipment fails because of such defects and Gefen is notified within two (2) years from the date of shipment, Gefen will, at its option, repair or replace the equipment, provided that the equipment has not been subjected to mechanical, electrical, or other abuse or modifications. Equipment that fails under conditions other than those covered will be repaired at the current price of parts and labor in effect at the time of repair. Such repairs are warranted for ninety (90) days from the day of reshipment to the Buyer.

This warranty is in lieu of all other warranties expressed or implied, including without limitation, any implied warranty or merchantability or fitness for any particular purpose, all of which are expressly disclaimed.

1. Proof of sale may be required in order to claim warranty.
2. Customers outside the US are responsible for shipping charges to and from Gefen.
3. Copper cables are limited to a 30 day warranty and cables must be in their original condition.

The information in this manual has been carefully checked and is believed to be accurate. However, Gefen assumes no responsibility for any inaccuracies that may be contained in this manual. In no event will Gefen be liable for direct, indirect, special, incidental, or consequential damages resulting from any defect or omission in this manual, even if advised of the possibility of such damages. The technical information contained herein regarding the features and specifications is subject to change without notice.

For the latest warranty coverage information, refer to the Warranty and Return Policy under the Support section of the Gefen Web site at www.gefen.com.

PRODUCT REGISTRATION

Please register your product online by visiting the Register Product page under the Support section of the Gefen Web site.

Contacting Gefen Technical Support

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c/o Customer Service
20600 Nordhoff St.
Chatsworth, CA 91311

Telephone: (818) 772-9100
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Fax: (818) 772-9120

Email: support@gefenpro.com

Visit us on the Web: www.gefenpro.com

Technical Support Hours: 8:00 AM to 5:00 PM Monday - Friday, Pacific Time

For 24 / 7 support, see the back of the product for the support number

16x16 Modular Matrix is a trademark of Gefen, LLC.

Important Notice

Gefen, LLC reserves the right to make changes in the hardware, packaging, and any accompanying documentation without prior written notice.

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Operating Notes

- There is no internal scaling in the *16x16 Modular Matrix*. All of the attached monitors must be able to display the output resolutions of the source devices. For maximum compatibility it is recommended that only one compatible/common resolution be used by all of the source devices.
- Routing features can be accessed using RS-232 or IP control. See RS-232 and IP Configuration for more information.
- The *16x16 Modular Matrix* provides several different pre-configured packages to suit the needs of your application. This User Manual covers all available configurations. See Pre-Configured Options for information on identifying the type of *16x16 Modular Matrix* that was purchased.

Features and Packing List

Features

- Supports up to two modular input cards and two modular output cards, each with eight connectors
- Supports resolutions up to 1920 x 1200
- Advanced EDID management for rapid integration of sources and displays
- RS-232 Serial interface for remote control via a computer or automation control system
- Built-in Web server and Telnet control via IP
- Front-panel LCD display
- Front-panel push buttons for local switching
- Routing states can be stored and recalled at the touch of a button
- Dual redundant hot-swappable power supplies
- Removable and replaceable fan and filter modules
- Output masking command
- Standby mode
- Power ON / OFF switch
- Rack-mountable

Packing List

See Pre-Configured Options for packing list details for each pre-configured option. If any of these items are not present in your box when you first open it, immediately contact your dealer or Gefen.

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Pre-Configured Options

The following list outlines the available pre-configured options. Because this User Manual covers information on all available configurations, it is important to identify the type of 16x16 Modular Matrix that was purchased.

- **16 DVI Input / 16 DVI Output (GEF-MOD-16416-DVI)**

  Two input cards. Each card uses eight DVI inputs, providing a total of 16 DVI inputs.

  Two output cards. Each card uses eight DVI outputs, providing a total of 16 DVI outputs.

  Packing List:

  (1) 16x16 Modular Matrix Frame
  (1) DB-9 cable
  (2) AC power cords
  (2) Modular Matrix 8 DVI Input Cards
  (2) Modular Matrix 8 DVI Output Cards
  (1) Quick-Start Guide

- **16 DVI Input / 16 CAT-5 ELR Output (GEF-MOD-16416-DVIELR)**

  Two input cards. Each card uses eight DVI inputs, providing a total of 16 DVI inputs.

  Two output cards. Each card uses eight ELR-POL outputs. Each of these ELR-POL outputs are connected to a Receiver unit, using a CAT-5e cable, allowing you to extend the DVI signal up to 330 feet (100 meters). 16 ELR-POL Receiver units are included with this package option.

  Packing List:

  (1) 16x16 Modular Matrix Frame
  (1) DB-9 Cable
  (2) AC Power Cords
  (2) Modular Matrix 8 DVI Input Cards
  (2) Modular Matrix 8 DVI Sender over CAT-5 Cards
  (16) DVI ELR Receivers with POL
  (1) Quick-Start Guide

- **16 CAT-5 ELR Input / 16 CAT-5 ELR Output (GEF-MOD-16416-ELR)**

  Two input cards. Each card uses eight ELR-POL inputs, providing a total of 16 ELR-POL inputs. Each of these ELR-POL inputs are connected to a Sender unit, using a CAT-5e cable, allowing you to extend the matrix up to 330 feet (100 meters) away from the DVI source. 16 ELR-POL Sender units are included with this package option.

  Two output cards. Each card uses eight ELR-POL outputs. Each of these ELR-POL outputs are connected to a Receiver unit, using a CAT-5e cable, allowing you to extend the DVI signal up to 330 feet (100 meters). 16 ELR-POL Receiver units are included with this package option.

  Packing List:

  (1) 16x16 Modular Matrix Frame
  (1) DB-9 Cable
  (2) AC Power Cords
  (2) Modular Matrix 8 ELR-POL Input Cards
  (2) Modular Matrix 8 ELR-POL Output Cards
  (16) DVI ELR-POL Senders
  (16) DVI ELR-POL Receivers
  (1) Quick-Start Guide

- **16 DisplayPort Input / 16 DVI Output (GEF-MOD-16416-DPDVI)**

  Two input cards. Each card uses eight DisplayPort inputs, providing a total of 16 DisplayPort inputs.

  Two output cards. Each card uses eight DVI outputs, providing a total of 16 DVI outputs.

  Packing List:

  (1) 16x16 Modular Matrix Frame
  (1) DB-9 Cable
  (2) AC Power Cords
  (2) Modular Matrix 8 DisplayPort Cards
  (2) Modular Matrix 8 DVI Output Cards
  (1) Quick-Start Guide

- **16 DisplayPort Input / 16 CAT-5 ELR Output (GEF-MOD-16416-DPELR)**

  Two input cards. Each card uses eight DisplayPort inputs, providing a total of 16 DisplayPort inputs.

  Two output cards. Each card uses eight ELR-POL outputs. Each of these ELR-POL outputs are connected to a Receiver unit, using a CAT-5e cable, allowing you to extend the DisplayPort signal up to 330 feet (100 meters). 16 ELR-POL Receiver units are included with this package option.

  Packing List:

  (1) 16x16 Modular Matrix Frame
  (1) DB-9 Cable
  (2) AC Power Cords
  (2) Modular Matrix 8 DisplayPort Cards
  (2) Modular Matrix 8 DVI Sender over CAT-5 Cards
  (16) DVI ELR Receivers with POL
  (1) Quick-Start Guide

- **16 DVI Input / 16 Fiber Output (GEF-MOD-16416-DVI1FO)**

  Two input cards. Each card uses eight DVI inputs, providing a total of 16 DVI inputs.

  Two output cards. Each card uses eight SC-type fiber optic connectors. Each of these fiber optic connectors are connected to a Receiver unit, allowing you to extend the DVI signal up to 6600 feet (2 kilometers) using 50µ OM3e multimode fiber optic cable. OM3 and OM1 fiber are also supported. 16 fiber optic Receiver units are included with this package option.

  Packing List:

  (1) 16x16 Modular Matrix Frame
  (1) DB-9 Cable
  (2) AC Power Cords
  (2) Modular Matrix 8 DVI Input Cards
  (2) Modular Matrix 8FO Sender Cards
  (16) DVI Modular Receivers over 1FO
  (16) Power supplies for DVI Modular Receivers over 1FO
  (1) Quick-Start Guide

- **16 DisplayPort Input / 16 Fiber Output (GEF-MOD-16416-DP1FO)**

  Two input cards. Each card contains eight DisplayPort inputs, providing a total of 16 DisplayPort inputs.

  Two output cards. Each card contains eight SC-type fiber optic connectors. Each of these fiber optic connectors are connected to a Receiver unit, allowing you to extend the DisplayPort signal up to 6600 feet (2 kilometers) using 50µ OM3e multimode fiber optic cable. OM3 and OM1 fiber are also supported. 16 fiber optic Receiver units are included with this package option.

  Packing List:

  (1) 16x16 Modular Matrix Frame
  (1) DB-9 Cable
  (2) AC Power Cords
  (2) Modular Matrix 8 DisplayPort Input Cards
  (2) Modular Matrix 8FO Sender Cards
  (16) DVI Modular Receivers over 1FO
  (16) Power supplies for DVI Modular Receivers over 1FO
  (1) Quick-Start Guide

- **16 Fiber Input / 16 Fiber Output (GEF-MOD-16416-1FO)**

  Two input cards. Each card uses eight SC-type fiber optic inputs, providing a total of 16 fiber optic inputs. Each of these fiber optic inputs are connected to a Sender unit, using single-strand 50µ OM3e/OM4 multimode fiber optic cable, allowing you to extend the matrix up to 6600 feet (2 kilometers) away from the DVI source. OM3 and OM1 fiber are also supported. 16 fiber optic Sender units are included with this package option.

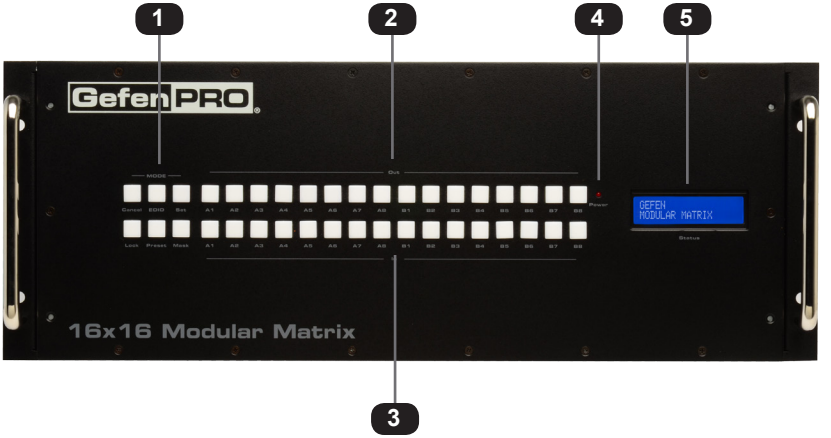
  Two output cards. Each card uses eight SC-type fiber optic connectors. Each of these fiber optic connectors are connected to a Receiver unit, allowing you to extend the DVI signal up to 6600 feet (2 kilometers) using 50µ OM3e/OM4 multimode fiber optic cable. OM3 and OM1 fiber are also supported. 16 fiber optic Receiver units are included with this package option.

  Packing List:

  (1) 16x16 Modular Matrix Frame
  (1) DB-9 Cable
  (2) AC Power Cords
  (2) Modular Matrix 8 FO Sender Cards
  (2) Modular Matrix 8 FO Receiver Cards
  (16) DVI Modular Receivers over 1FO
  (16) DVI Modular Senders over 1FO
  (16) Power supplies for DVI Modular Receivers over 1FO
  (16) Power supplies for DVI Modular Senders over 1FO
  (1) Quick-Start Guide

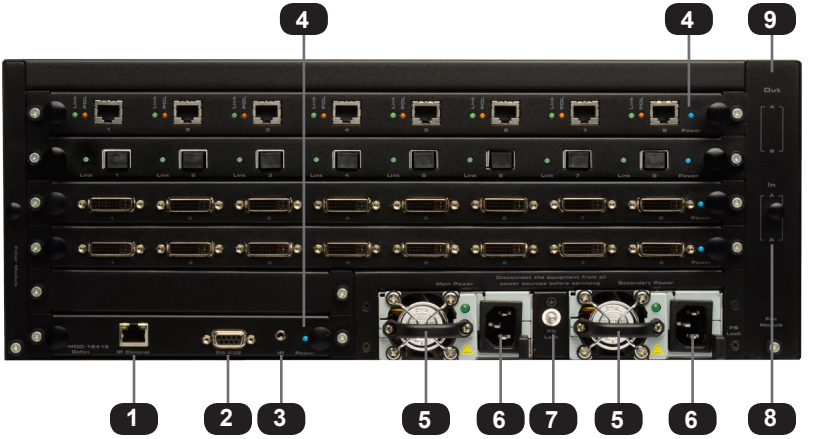
Panel Layout

Front Panel



ID	Name	Description
1	Mode buttons	Used to control various features on the Matrix. See Front Panel Controls for more information.
2	Out	Used for routing an Input to an Output. Each of these buttons represents an Output. See Routing Basics for more information on routing sources.
3	In	Used for routing an Input to an Output. Each of these buttons represents an Input. See Routing Basics for more information on routing sources.
4	Power	This LED indicator will glow bright red when the matrix is powered ON.
5	LCD display	Provides feedback of matrix features during operation.

Back Panel

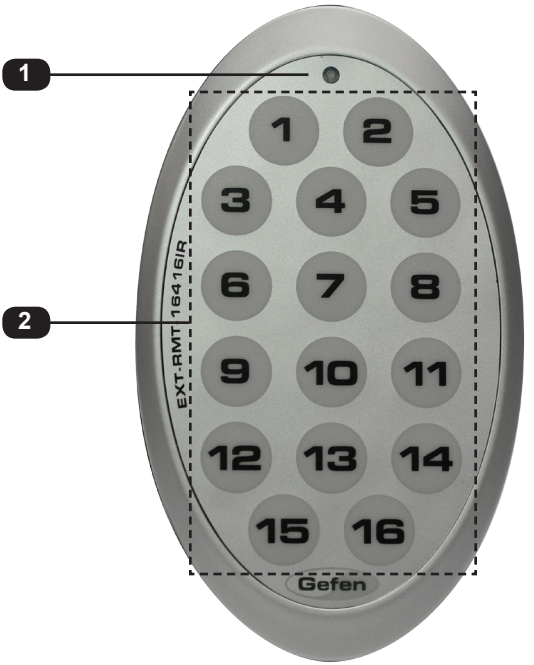


ID	Name	Description
1	IP Control	Connect an Ethernet cable between this jack and a LAN to use IP control. See IP / UDP Configuration for more information.
2	RS-232	Connect the included RS-232 cable from this port to an RS-232 device. See RS-232 and IP Configuration for more information.
3	IR	Connect an IR Extender (Gefen part no. EXT-RMT-IREXTN).
4	Power	This LED indicator glows bright blue when the matrix / board is powered.
5	Power supply	100 - 240V AC internal hot-swappable power supply.
6	IEC connector	Connect the included AC power cords from these power receptacles to available electrical outlets.
7	Grounding terminal	Connect a grounding wire from the grounding terminal to an approved ground path.
8	In (A/B)	These two expansion bays accept Input cards, only.
9	Out (A/B)	These two expansion bays accept Output cards, only.

IR Remote Control Unit

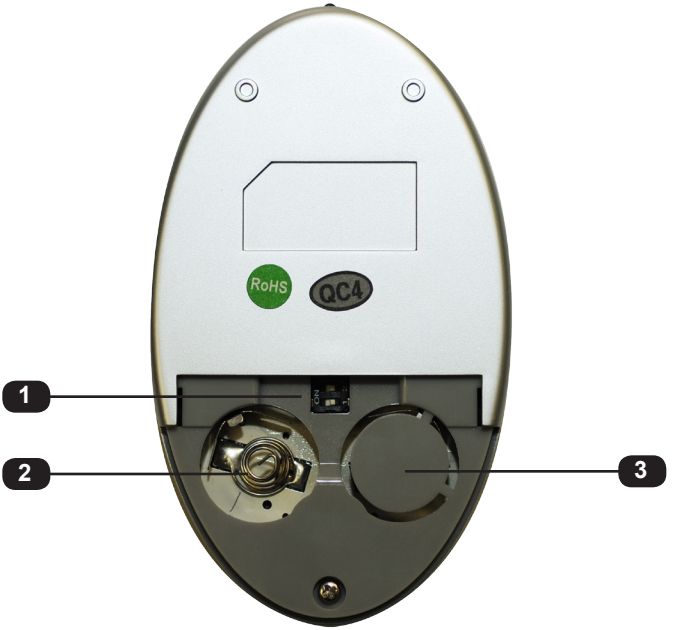
NOTE: The IR remote control (Gefen part no. RMT-16416IR) unit is sold separately.

Front



ID	Name	Description
1	Activity indicator	This LED glows bright orange when a key is pressed on the remote.
2	Buttons (1 - 16)	Used to select the desired matrix routing.

Back
(shown with cover removed)



ID	Name	Description
1	DIP switch bank	Use these DIP switches to set the IR channel of the remote. See Setting the IR Channel for more information.
2	Primary battery slot (shown without battery)	Holds the battery for operating the remote. Use only 3V CR2032-type batteries. Make sure that the positive (+) side of the battery is facing up.
3	Alternate battery slot	Allows for the installation of secondary (backup) battery.

Installing the Battery

The IR remote control unit ships with two batteries. Only one battery is required for operation. The second battery is a spare. Use only 3V CR2032-type batteries.

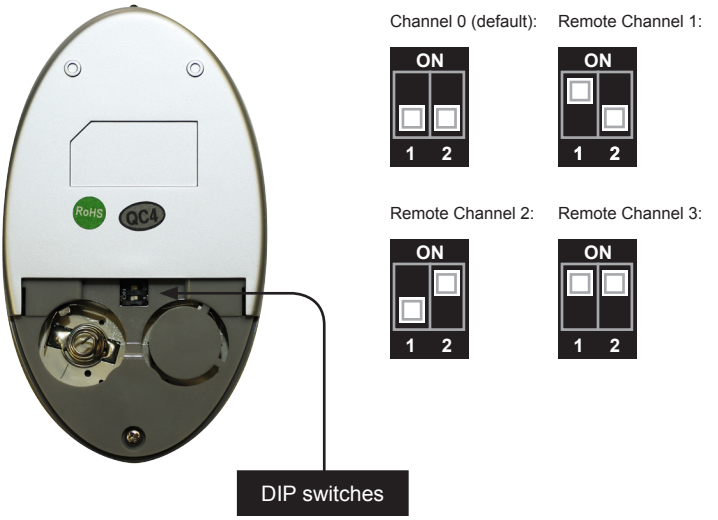
1. Remove the back cover the IR Remote Control unit.
2. Insert the included battery into the primary battery slot. The positive (+) side of the battery should be facing up.
3. Replace the back cover.

WARNING: Risk of explosion if battery is replaced by an incorrect type. Dispose of used batteries according to the instructions.

NOTE: If the Activity Indicator, on the IR remote control unit, flashes quickly while holding down any one of the buttons, then this indicates a low battery. Replace the battery as soon as possible.

Setting the IR Channel

In order for the included IR remote control to communicate with the 16x16 Modular Matrix, the IR remote control must be set to the same channel as the matrix. See the `#set_ir` command for instructions on setting the IR channel of the matrix.

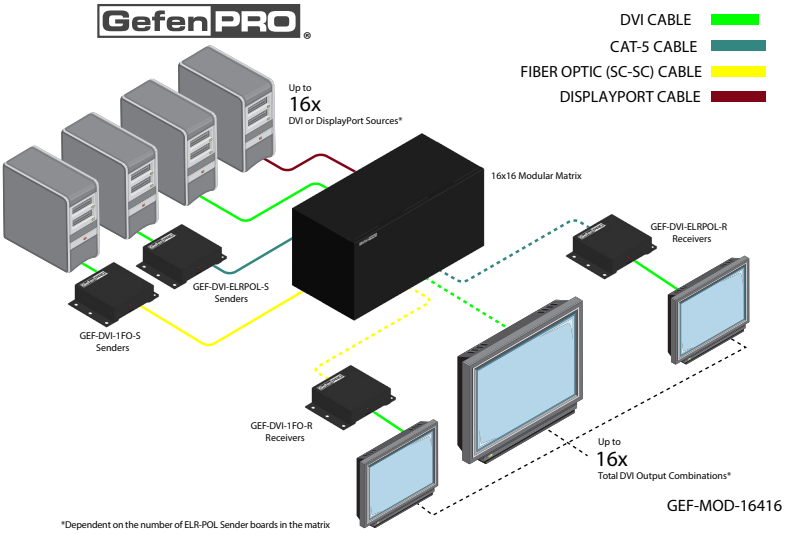


Installation

Because there are several variations of the *16x16 Modular Matrix*, we will cover each package option. Locate the connection instructions for the package which was purchased. The wiring diagram at the bottom of the page provides a general reference for connecting the *16x16 Modular Matrix*. See the following pages for detailed connection instructions on each package option.

- GEF-MOD-16416-DVI.....page 12
- GEF-MOD-16416-DVIELR.....page 12
- GEF-MOD-16416-ELR.....page 14
- GEF-MOD-16416-DVI1FO.....page 16
- GEF-MOD-16416-1FO.....page 18
- GEF-MOD-16416-DVIDVI.....page 20
- GEF-MOD-16416-DPELR.....page 20
- GEF-MOD-16416-DP1FO.....page 20

Sample Wiring Diagram



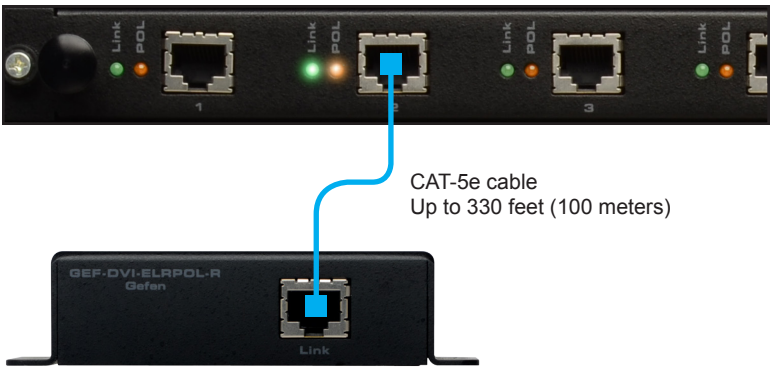
WARNING: This product should always be connected to a grounded electrical AC outlets.

GEF-MOD-16416-DVI

1. Connect up to 16 DVI sources to the DVI inputs on the rear panel of the 16x16 Modular Matrix using DVI cables.
2. Connect up to 16 DVI displays to the DVI outputs on the rear panel of the 16x16 Modular Matrix.
3. Connect both AC power cords from the 16x16 Modular Matrix to available electrical outlets. Connecting both AC power cords will provide redundancy should one of the power supplies fail. It is recommended to connect each power cord to electrical outlets on two separate circuits.

GEF-MOD-16416-DVIELR

1. Connect up to 16 DVI sources to the DVI inputs on the rear panel of the *16x16 Modular Matrix* using DVI cables.
2. Connect a CAT-5e cable (or better), up to 330 feet (100 meters) from each ELR-POL jack on the Sender card to each of the included ELR-POL Receiver units, as shown below.

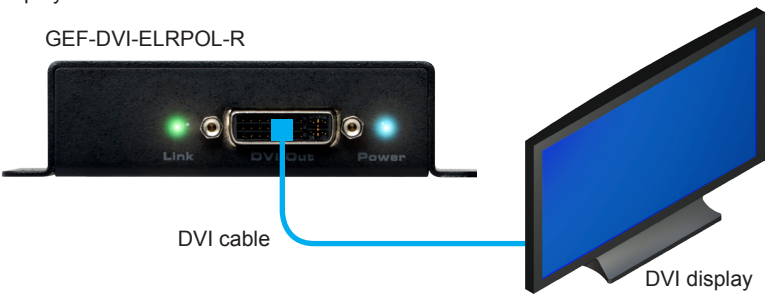


Once the matrix is powered, the Link indicators will glow bright green to indicate a solid link between the output card and the Receiver unit.

The POL indicators will glow bright amber to indicate that the Receiver unit is being powered.

(continued on next page)

3. Connect a DVI cable from the DVI Out port on each ELR-POL Receiver unit to a DVI display.



4. Connect both AC power cords from the *16x16 Modular Matrix* to available electrical outlets. Connecting both AC power cords will provide redundancy should one of the power supplies fail. It is recommended to connect each power cord to electrical outlets on two separate circuits.

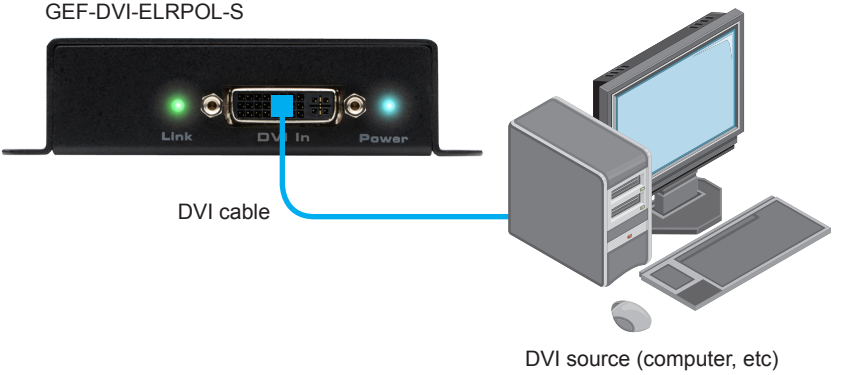
   Power to the Receiver unit is delivered from the power supply in the matrix over the CAT-5e cable using Gefen Power Over Line (POL) technology. The Link indicator will glow bright green to indicate a solid connection between the matrix and the Receiver unit. The Power indicator will glow bright blue to indicate that the Receiver unit is being powered.

   If either of these LED indicators are OFF, inspect the CAT-5 cable for loose connections or possible defects.

GEF-MOD-16416-ELR

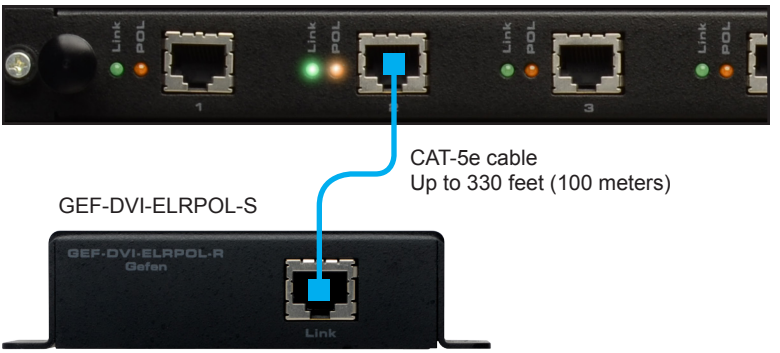
1. Connect up to 16 DVI sources to the DVI inputs on each of the DVI ELR-POL Sender units using DVI cables.

GEF-DVI-ELRPOL-S



2. Connect a CAT-5e cable (or better), up to 330 feet (100 meters) from each Sender unit to each ELR-POL jack on the Receiver card, as shown below:

GEF-MOD-8ELRPOL-R

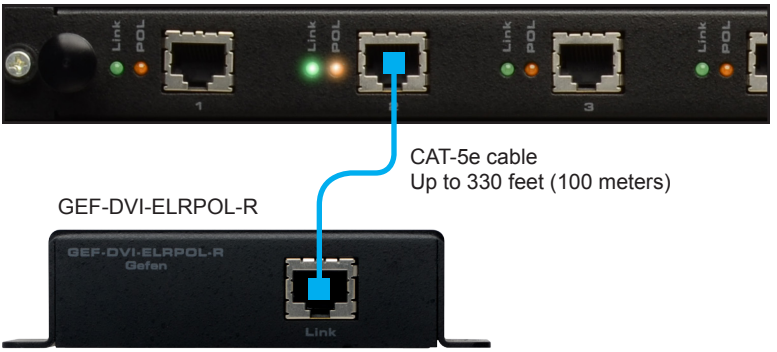


Once the matrix is powered, the Link indicators will glow bright green to indicate a solid link between the output card and the Receiver unit.

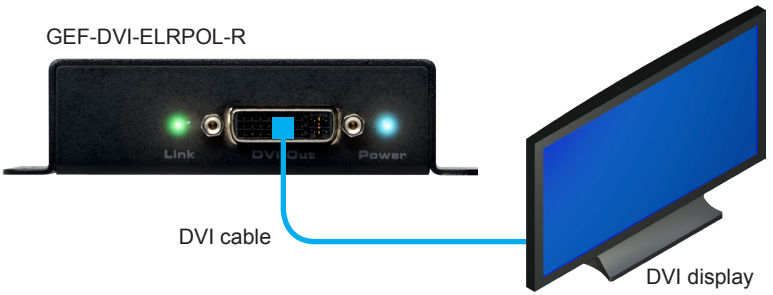
The Power indicator will glow bright blue to indicate that the Sender unit is being powered.

3. Connect a CAT-5e cable (or better), up to 330 feet (100 meters) from each ELR-POL jack on the Output card to each Receiver unit.

GEF-DVI-8ELR-S



4. Connect a DVI cable from the DVI Out port on each ELR-POL Receiver unit to a DVI display.



5. Connect both AC power cords from the *16x16 Modular Matrix* to available electrical outlets. Connecting both AC power cords will provide redundancy should one of the power supplies fail. It is recommended to connect each power cord to electrical outlets on two separate circuits.

   Power to the Receiver unit is delivered from the power supply in the matrix over the CAT-5e cable using Gefen Power Over Line (POL) technology. The Link indicator will glow bright green to indicate a solid connection between the matrix and the Receiver unit. The Power indicator will glow bright blue to indicate that the Receiver unit is being powered.

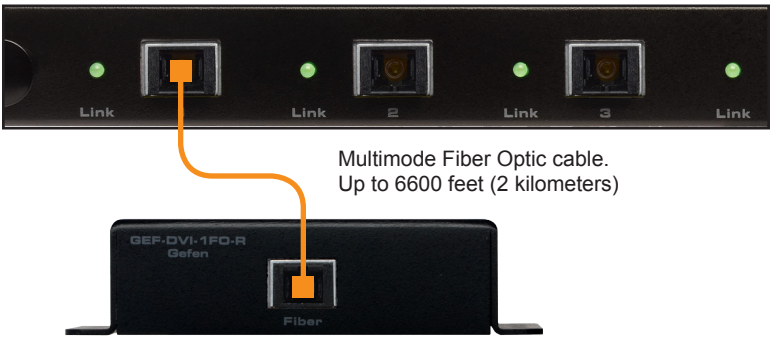
   If either of these LED indicators are OFF, inspect the CAT-5 cable for loose connections or possible defects.

GEF-MOD-16416-DVI1FO

1. Connect up to 16 DVI sources to the DVI inputs on the rear panel of the *16x16 Modular Matrix* using DVI cables.

2. Connect a single strand of SC-terminated 50µ OM3e multimode fiber optic cable from each SC-type connector on the Sender card to each Receiver unit, as shown below.

   GEF-DVI-8FO-S



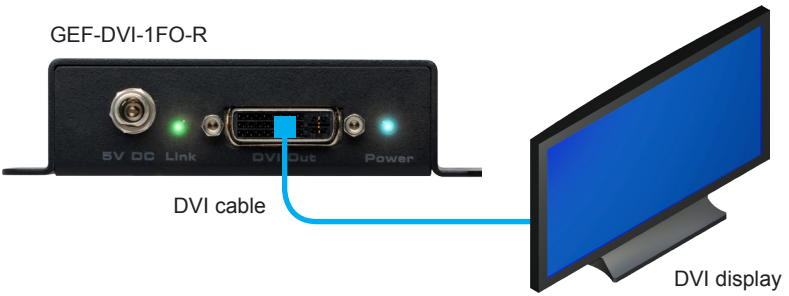
   50µ OM3e/OM4, OM3, and 62.5µ OM1 multimode fiber optic cable can be used. However, the maximum extension distance will be dependent upon the type of fiber optic cable used. Refer to the table, below.

Fiber Type	Maximum Distance
Multimode, 50µ OM3e/OM4	6600 feet (2 kilometers)
Multimode, 50µ OM3	2000 feet (600 meters)
Multimode, 62.5µ OM1	660 feet (200 meters)

3. Connect the included power supplies to each 1FO Receiver unit then connect the power supply to an available electrical outlet.

(continued on next page)

4. Connect a DVI cable from the DVI Out port on each ELR-POL Receiver unit to a DVI display.



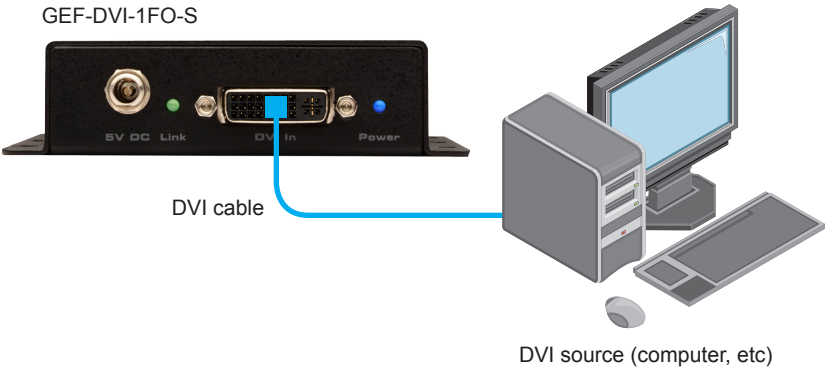
5. Connect both AC power cords from the matrix to available electrical outlets. Connecting both AC power cords will provide power redundancy should one of the power supplies fail. It is recommended to connect each AC power cord to separate circuits.

   The Link indicator (on the Receiver unit) will glow bright green to indicate a connection between the matrix and the Receiver unit. If the Link indicator is OFF, then inspect the fiber optic cable for loose connections or possible defects.

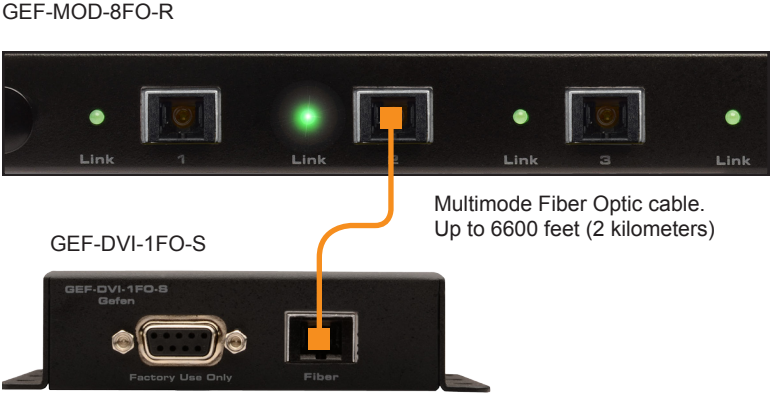
   The Power indicator will glow bright blue to indicate that the Receiver unit is powered.

GEF-MOD-16416-1FO

1. Connect up to 16 DVI sources to the DVI inputs on each of the DVI ELR-POL Sender units using DVI cables.

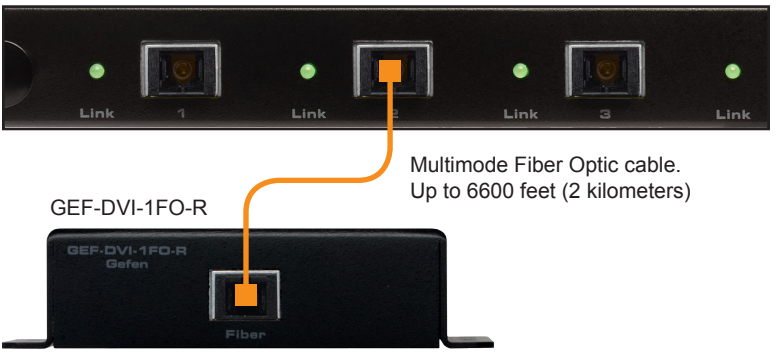


2. Connect a single strand of SC-terminated multimode fiber optic cable from each SC-type connector on the Receiver card to each Sender unit, as shown below.

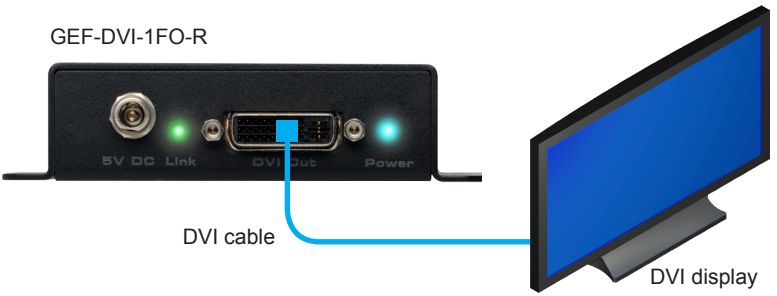


3. Connect the included power supplies to each 1FO Receiver unit then connect the power supply to an available electrical outlet.

GEF-DVI-8FO-S



4. Connect a DVI cable from the DVI Out port on each 1FO Receiver unit to a DVI display.



5. Connect the included power supplies to each 1FO Sender and Receiver unit then connect each power supply to an available electrical outlet.

6. Connect both AC power cords from the *16x16 Modular Matrix* to available electrical outlets. Connecting both AC power cords will provide redundancy should one of the power supplies fail. It is recommended to connect each power cord to electrical outlets on two separate circuits.

   The Link indicators on the Sender and Receiver units will glow bright green to indicate a solid connection between the source and the matrix. The Power indicator will glow bright blue to indicate that the Sender and Receiver units are being powered.

   If the Link LED indicators are OFF, inspect the fiber cable for loose connections or possible defects.

DisplayPort Package Options

Each DisplayPort package is based on the DVI package options, except for the fact that all inputs will be DisplayPort instead of DVI. Refer to the connection instructions for the DVI version of each package if needed.

GEF-MOD-16416-DPDVI (based on the GEF-MOD-16416-DVI)

1. Connect up to 16 DisplayPort sources to the DisplayPort inputs on the matrix.
2. Connect up to 16 displays to the DVI outputs on the matrix using DVI cables.
3. Power the matrix.

GEF-MOD-16416-DPELR (based on the GEF-MOD-16416-DVIELR)

1. Connect up to 16 DisplayPort sources to each DisplayPort input on the matrix.
2. Connect a CAT-5e cable (or better), up to 330 feet (100 meters) from each ELR-POL jack on the output card to each of the included ELR-POL Receiver units.
3. Power the matrix.

   Once the matrix is powered, the Link indicators will glow bright green to indicate a solid link between the Matrix card and the Receiver unit. The POL indicators will glow bright amber to indicate that the Receiver unit is being powered.

GEF-MOD-16416-DP1FO (based on the GEF-MOD-16416-DVI1FO)

1. Connect up to 16 DisplayPort sources to the DisplayPort inputs on the matrix.
2. Connect a single strand of SC-terminated 50µ OM3e multimode fiber optic cable from each SC connector on the Sender module to each Receiver module.

   50µ OM3e, OM3, and 62.5µ OM1 multimode fiber optic cable can be used. However, the maximum extension distance is dependent upon the type of fiber optic cable used:
3. 6600 feet (2 kilometers) using 50µ OM3e multimode fiber optic cable.
4. 2000 feet (600 meters) using 50µ OM3 multimode fiber optic cable.
5. 660 feet (200 meters) using 62.5µ OM1 multimode fiber optic cable.
6. Connect the power supply to the 1FO Receiver unit then connect the power supply to an available electrical outlet.
7. Power the matrix.

16 SOURCES x 16 DISPLAYS | Modular Matrix

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Front Panel Controls

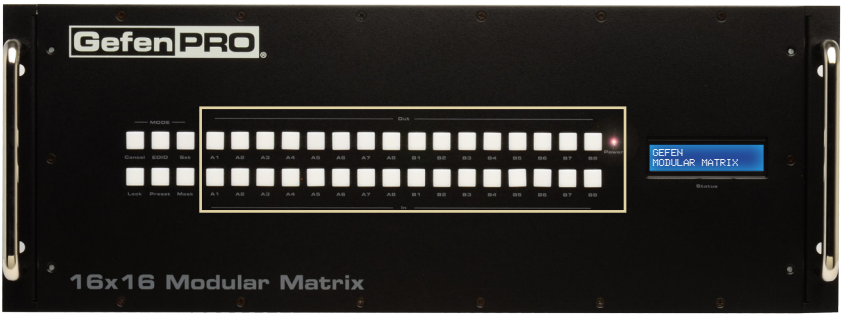
Front Panel Buttons

There are a total of 38 buttons on the front panel of the matrix. These buttons are grouped according to their function.

Out and In

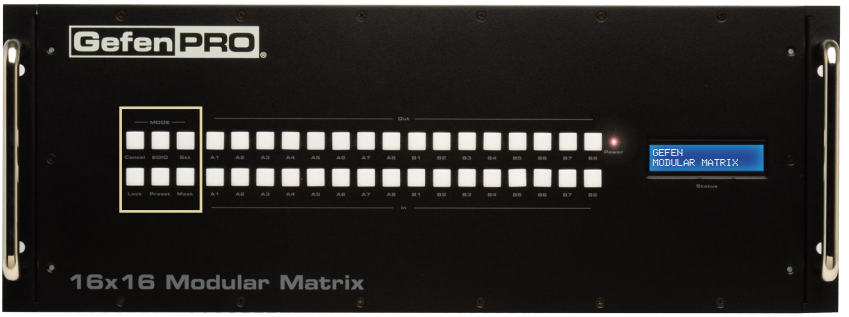
The Out and In buttons comprise the largest group of buttons. The top row of 16 buttons represent the outputs, while the bottom row of 16 buttons represent the inputs.

For example, button A1 on the top row represents Output 1, button A2 represents Output 2, and so on. The input buttons on the bottom row are arranged in a similar fashion: Button A1 on the bottom row represent Input 1, button A2 represents Input 2, and so on.



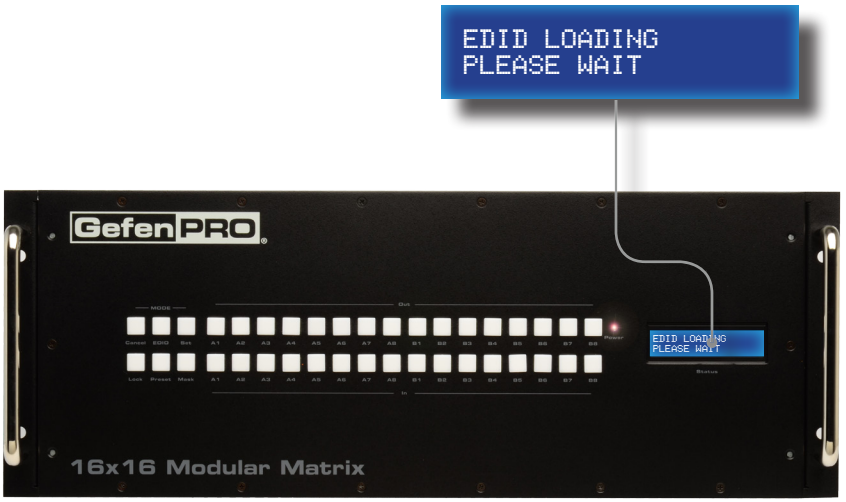
Mode

The Mode buttons are used to control various other functions on the matrix such as output masking, EDID management, and loading and storing of presets.



Front Panel LCD Screen

The front-panel of the 16x16 Modular Matrix contains a 16-character 2-line LCD display which is used to provide feedback when performing routing functions. In addition, this display is used to show the current routing status of the matrix.

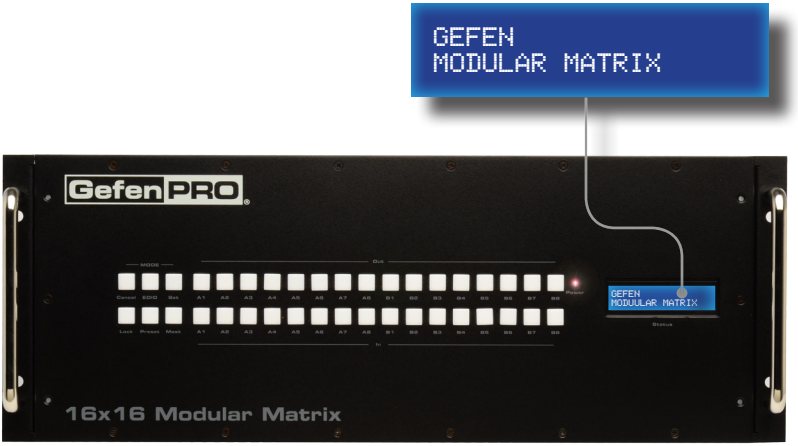


When the matrix has been powered ON, power-cycled, or rebooted the following three screens will appear in order:

LCD Screen	Description
EDID LOADING PLEASE WAIT	Matrix is loading EDID data to local inputs.
EDID LOADING COPYING COMPLETED	EDID copying has completed.
GEFEN MODULAR MATRIX	This is the Home screen. The matrix is now ready to be used.

Displaying Matrix Settings

Besides displaying routing information and other feedback during various operations, the matrix provides setting information, from the Home screen:



From the Home screen, consecutively press the Cancel button to display other matrix settings. The matrix will automatically return the Home screen after a few moments, if the Cancel button is not pressed within a certain amount of time.

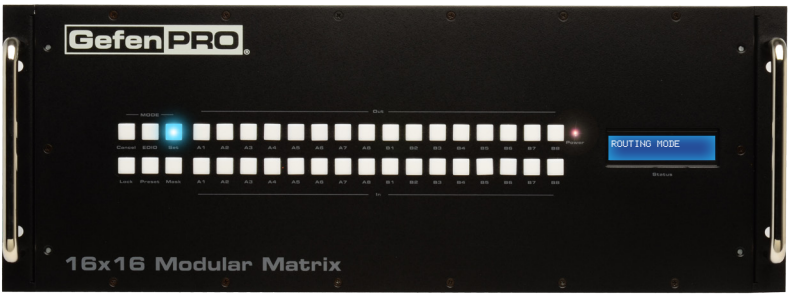
LCD Screen	Description
MATRIX FIRMWARE 0.04.07	Displays the current version of the firmware.
IP ADDRESS 192.168.2.235	Displays the current IP address of the matrix. See page 53 for information on changing the IP address of the matrix.
MAC ADDRESS 0.1C.91.3.10.0	Displays the MAC address of the matrix. The MAC address cannot be changed.
WEB PORT:80 TCP TERM:23	Displays the Web listening port and TCP terminal (Telnet) port.

Routing Basics

Routing Inputs to Outputs

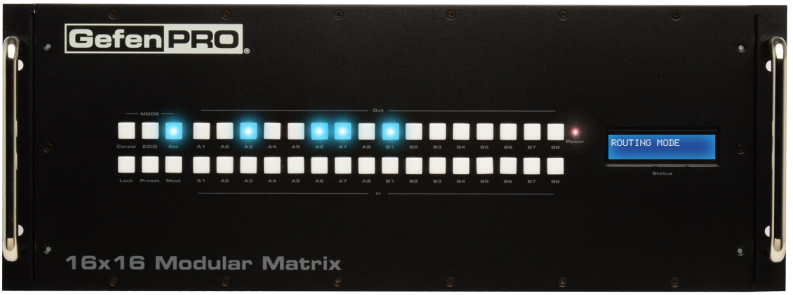
The following example illustrates the routing process. An input may be routed to a single or multiple outputs. Multiple inputs cannot be routed to a single output.

1. Press the **Set** button on the front panel. Pressing the **Set** button tells the matrix that we want to perform a routing, masking, or preset operation. The Set button will glow bright blue, indicating that it has been pressed.



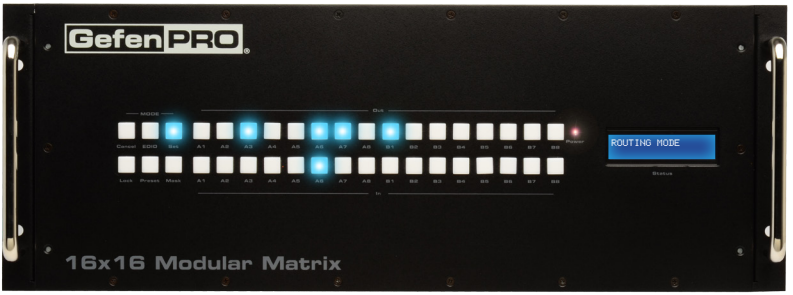
2. The LCD on the front panel will indicate that routing mode is active.

3. Press the desired output button(s) (A1 - B8). For this example, we will route the input (covered in the next step) to multiple outputs: Output 3, Output 6, Output 7, and Output 9. Press buttons A3, A6, A7, and B1. The selected buttons will glow bright blue.



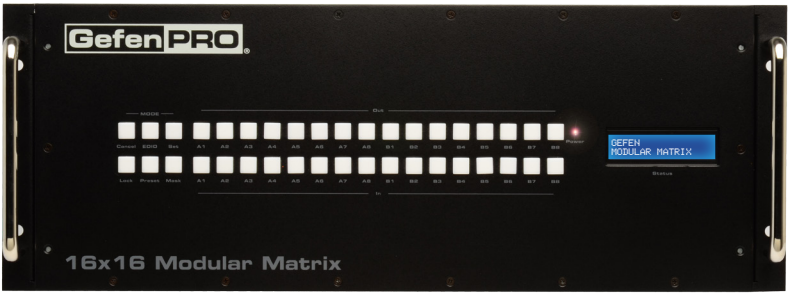
4. Select the desired input (source) button (A1 - B8). For this example, we want to route the source connected to Input 6 to each of the outputs in step 3. Therefore, press button **A6** on the bottom row. The selected input will glow bright blue.

> **NOTE:** Only one input can be routed at a time. If the wrong input button is accidentally pressed, then continue by pressing the correct input button. The previously input button will automatically be deselected.



5. Press the **Set** button on the front panel, once again. Pressing the Set button again tells the matrix that we have completed the routing operation. Once the **Set** button has been pressed, the LCD will indicate that the routing process has been completed.

6. After a few moments, the selected buttons on the front panel will turn off and the LCD will return to the Home screen.



Getting the Current Routing Status

To display the current routing status of the Matrix, press any one of the Input or Output buttons on the front panel.

From our previous routing example, we already know that Input 6 is routed to Output 3, 6, 7, and 9. However, let's use this to illustrate how to retrieve the current routing status of an input or output.

Outputs to Inputs

1. Press the button **A3** on the top row of buttons.

   When we pressed **A3** (on the top row), button **A6** on the bottom row was also selected. This tells us that Input 6 has been routed to Output 3.

2. Now, press button **A7** on the top row of buttons.

   We can see that Output 7 is also connected (routed) to Input 6. This agrees with our previous routing example.

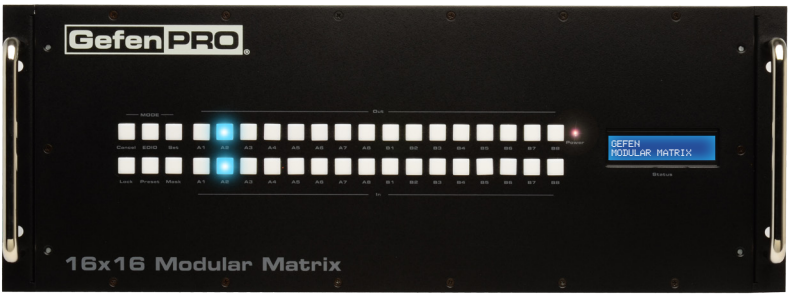
   If button **A6** or **B1** is pressed, Input 6 will also be associated with Output 6 and Output 9.

Inputs to Outputs

1. Press the **A6** button on the bottom row of buttons.

   By querying an input, all Outputs that are connected (routed) to the input are displayed:

2. Now, press another Input button on the matrix. We will arbitrarily select Input 2 (button **A2**).



   In the example above, we can see that Input 2 is routed to Output 2. This is called "one-to-one" routing. We could have achieved the same result by pressing Output 2.

One-to-One Routing

When an input-output pair share the same number, it is called "one-to-one" routing. By default, the 16x16 Modular Matrix is shipped in "one-to-one" mode. This means that Input 1 is routed to Output 1, Input 2 is routed to Output 2, and so on.

Saving the Current Routing State

The *16x16 Modular Matrix* allows routing (and masking) states to be saved to internal non-volatile memory. Each routing state can be recalled at a later time (see page 33). Even if the matrix is powered OFF, the presets will be retained in memory.

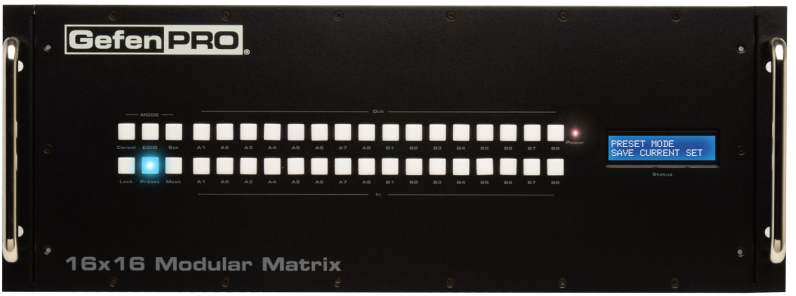
We'll illustrate an example by saving the routing state, created on page 27.

1. To make sure we are saving the correct routing state, press Input 6 on the front panel. The following routing state should be displayed:

This is the routing state we created on page 27.

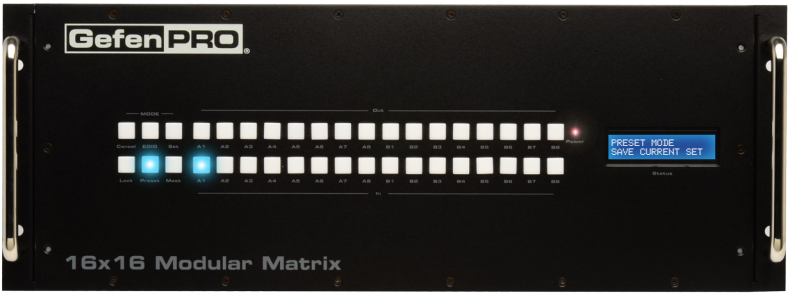
2. Press the **Cancel** button to hide the displayed routing state. The **Cancel** button will flash momentarily when pressed.

3. Press the **PreSet** button, *twice*.



The LCD will indicate that the matrix is in *save preset mode*:

4. Select a preset location by pressing any of the first eight input buttons (A1 - A8). The matrix supports up to eight preset locations. For this example, we will store the routing preset using button **A1**.



5. Press the **Set** button to store the routing state in the selected location. The **Set** button will flash momentarily.

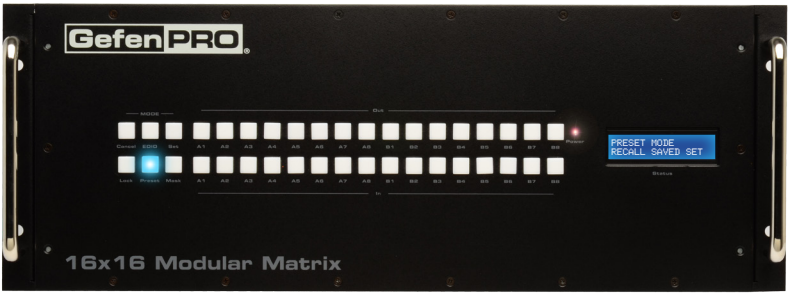
6. After a few moments, the selected buttons will turn off and the LCD will return to the Home screen.

Recalling a Saved Routing State

The *16x16 Modular Matrix* allows saved routing (and masking) states to be recalled from memory for instant access.

In this example, we will recall the routing preset that we stored in the previous example. In order to clearly see how the recall-process works, try changing the routing state of Input 6 to Output 2. Then, use the steps below to recall the original routing state. See Routing Inputs to Outputs, if necessary.

1. Press the **PreSet** button, *once*. The LCD will indicate that the matrix is in *recall preset mode*.



2. Since we stored our preset in Preset 1, press Input 1 to recall the routing state.

3. Press the **Set** button to recall the routing state from the selected location. The **Set** button will flash momentarily.

4. After a few moments, the selected buttons will turn off and the LCD will return to the Home screen.

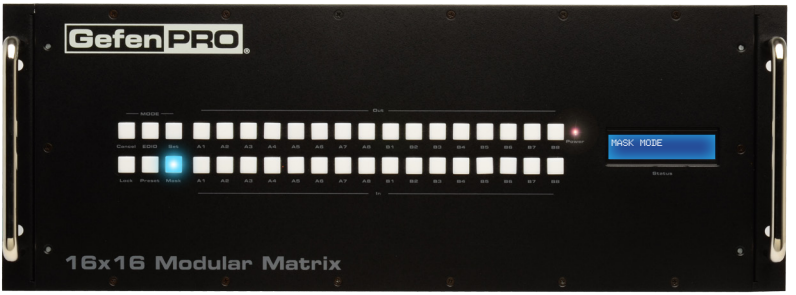
Masking

Masking Outputs

"Masking" prevents the output device (display, etc) from receiving an output signal. Instead of powering-down or disconnecting the output device, individual or multiple outputs can be masked.

To illustrate masking, we'll use our original routing example from page 27.

1. Press the **Mask** button. The **Mask** button will glow bright blue and the LCD will indicate that the matrix is in *mask mode*.

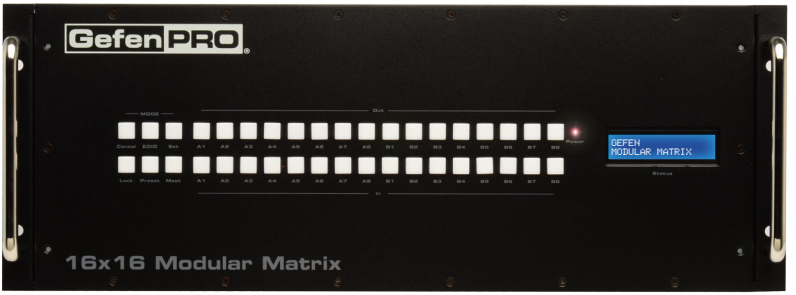


2. Select the desired outputs to be masked. In this example, we will select Output 6 and Output 7.

3. Press the **Set** button to mask the selected outputs. The **Set** button will flash momentarily.

4. Once the **Set** button is pressed, the LCD display will indicate that the masking process was successful:

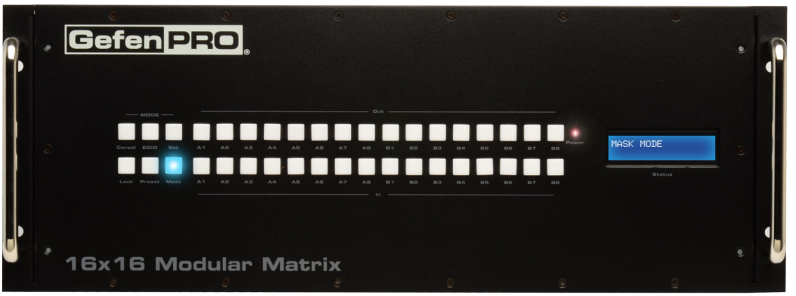
5. After a few moments, the selected buttons will turn off and the LCD will return to the Home screen.



Getting the Current Masking Status

If the masking state is unknown, it can be queried using the Mask button. Alternatively, the masking state can be retrieved through the Web Interface or by using the `m` command.

1. Press the **Mask** button. The **Mask** button will glow bright blue and the LCD will indicate that the matrix is in *mask mode*.



2. If any outputs are currently masked, they will be indicated on the front panel. For example, since we recently masked Output 6 and Output 7, these buttons will glow bright blue.

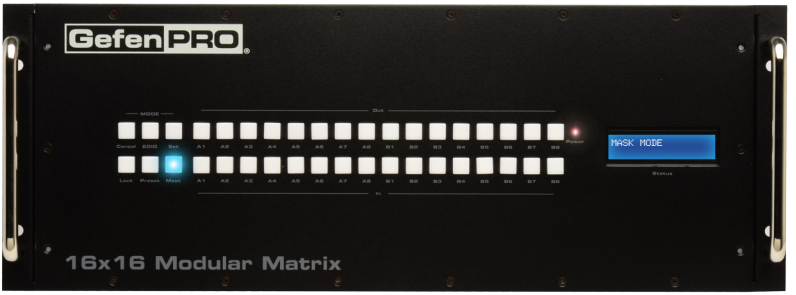
3. After a few moments, the selected buttons will turn off and the LCD will return to the Home screen.

Unmasking Outputs

Once an output (or multiple outputs) has been masked, it can be unmasked. Unmasking an output will allow the video signal to be displayed after a masking operation.

We'll continue with our previous example and unmask Output 6 and Output 7.

1. Press the Mask button. The **Mask** button will glow bright blue and the LCD will indicate that the matrix is in mask mode.



Once the **Mask** button is pressed, any outputs that have been masked will be indicated on the front panel.

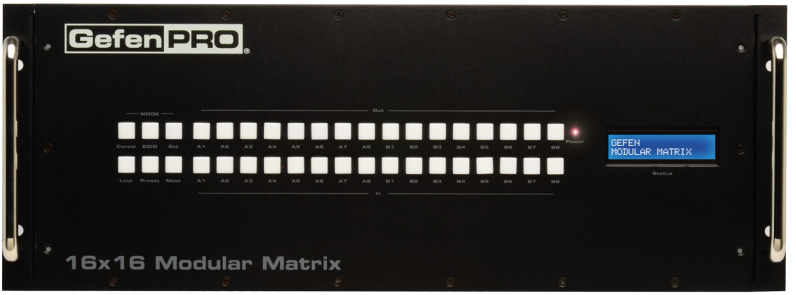
2. To unmask an output, press the desired output(s). In our case, we will select both Output 6 and Output 7.

Each button will turn off as it is pressed.

3. Press the **Set** button. The Set button will flash momentarily.

4. Once the **Set** button is pressed, the LCD display will indicate that the unmasking process was successful:

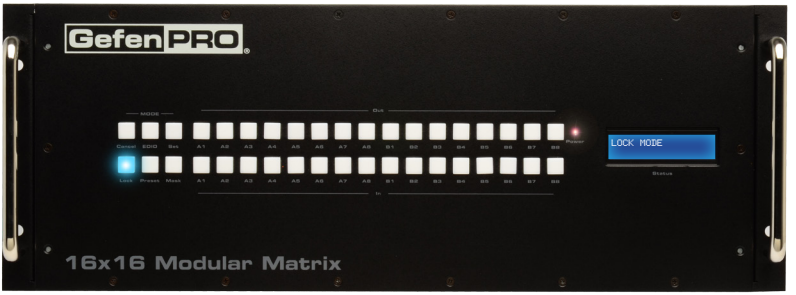
5. After a few moments, the matrix will return to the Home screen.



Locking the Matrix

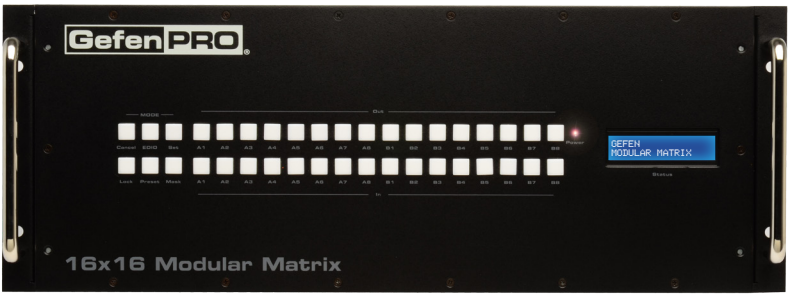
Locking the matrix will prevent any changes by disabling all buttons (except the Lock button) on the front panel. This feature is useful in preventing routing or other changes caused by accidentally bumping or pressing the buttons on the front panel.

1. Press the **Lock** button under the Mode group. The Lock button will glow bright blue, indicating that the matrix is now locked.



2. The LCD display will also indicate that the matrix has been locked:

3. To unlock the matrix, press the **Lock** button again. The **Lock** button will turn off and the LCD display will return to the Home screen.

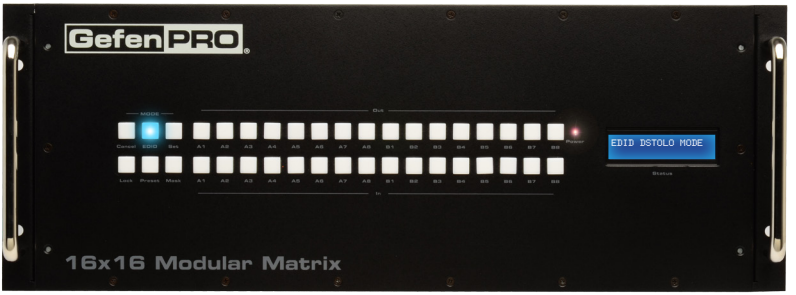


EDID Management

The 16x16 Modular Matrix incorporates EDID management support. Basic EDID functions, such as storing EDID data to inputs can be performed using the buttons on the front panel. Advanced EDID management features are controlled using RS-232 / IP Commands or through the Web Interface.

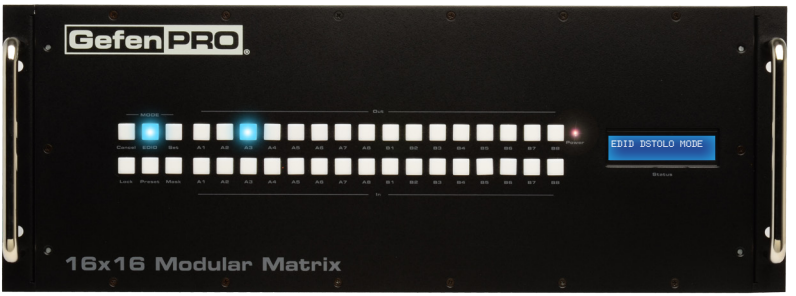
Saving the Downstream EDID to an Input

1. Press the **EDID** button, *once*. The **EDID** button will glow bright blue and the LCD will indicate that the matrix is ready to copy the downstream EDID.



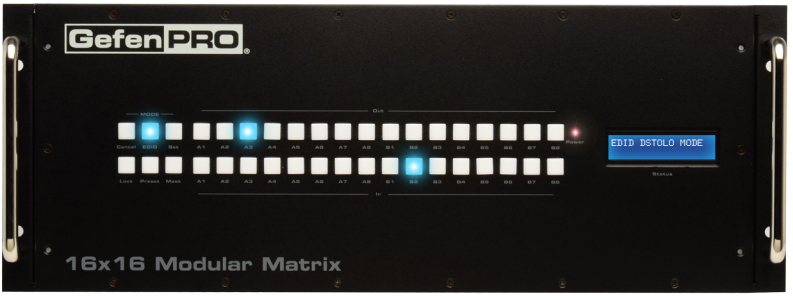
DSTOLO is an abbreviation for “DownStream TO LOcal”.

2. Press the desired output. For this example, we are going to copy the EDID of the display that is connected to Output 3. Therefore, we will press the button for Output 3.



(Continued on next page)

3. Select the desired input where the EDID will be stored. We will arbitrarily select Input 10, by pressing button **B2**.



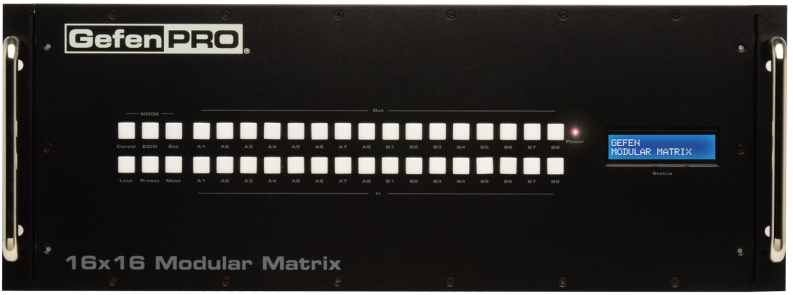
4. Press the **Set** button. The **Set** button will flash momentarily.

5. Once the **Set** button is pressed, the matrix will begin copying the downstream EDID from the display (or other sink) to the EDID from the selected output to the specified input.

   The LCD will indicate that the matrix is copying the EDID:

6. After the EDID has been successfully copied to the selected input, the LCD will display the following message:

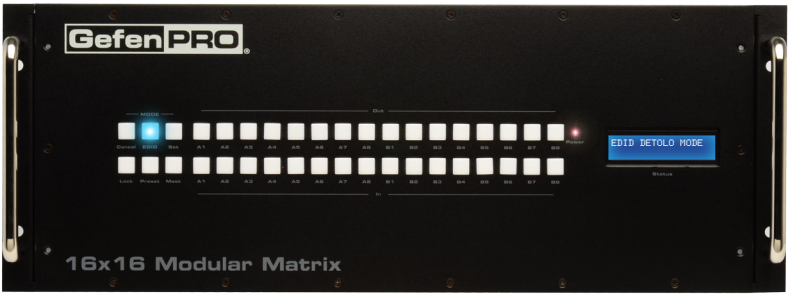
7. After a few moments, the selected buttons will turn off and the LCD will return to the Home screen.



Saving the Default EDID to an Input

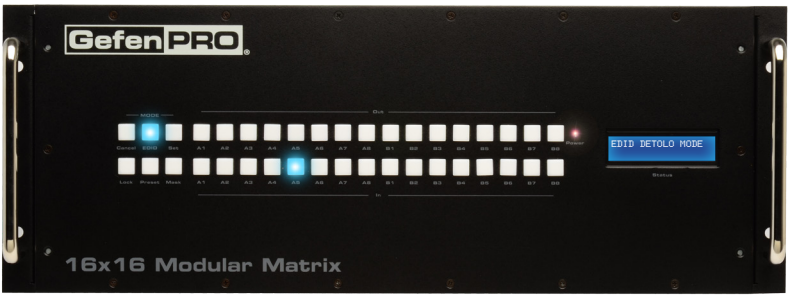
There may be instances when the downstream EDID data is corrupt or the EDID is not being read correctly by the matrix. On the other hand, it may be desirable to use a "generic" EDID as opposed to the downstream EDID. In any case, the matrix provides a default (internal) EDID that can be used. Let's look at an example.

1. Press the **EDID** button, *twice*. The EDID button will glow bright blue and the LCD will indicate that the matrix is ready to copy the default EDID to the specified input.



DETOLO is an abbreviation for "DEfault TO LOcal".

2. Select the input where the default EDID will be copied. For this example, we will copy the default EDID to Input 5. Therefore, we will press the button for Input 5.



3. Press the **Set** button. The Set button will flash momentarily.

4. Once the **Set** button is pressed, the matrix will begin copying the default EDID to the specified input.

   The LCD will indicate that the matrix is copying the EDID:

5. After the EDID has been successfully copied to the selected input, the LCD will display the following message:

6. After a few moments, the selected buttons will turn off and the LCD will return to the Home screen.

IR Control

Routing Sources using the IR Remote Control Unit

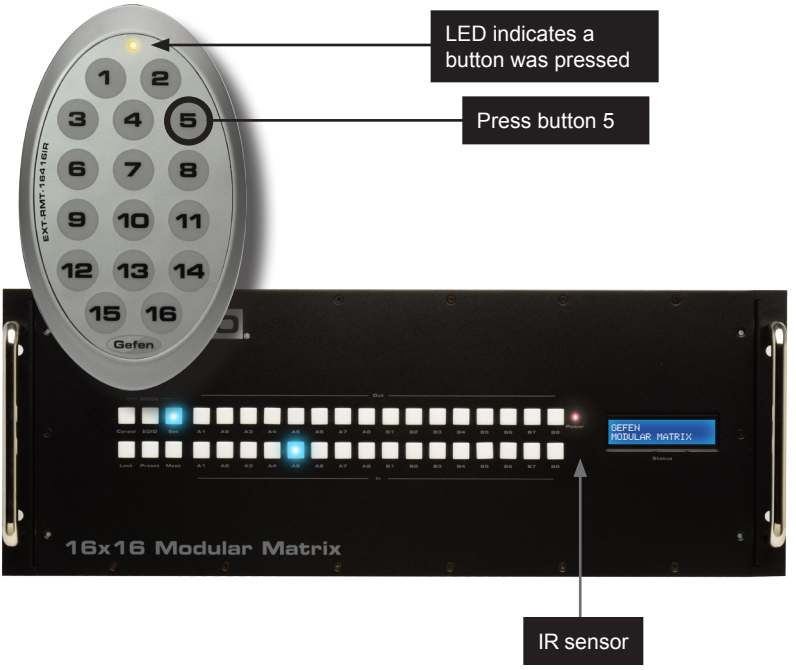
The 16x16 Modular Matrix can be controlled using the RMT-16416IR IR remote control unit (not included). The IR remote control unit provides discrete routing between each input and output. The IR remote control unit consists of 16 buttons. Each button represents an input / output. To route a source to a display, first press the button of the desired input, then press the button for the associated output. Let's look at an example.

In this example, we will route Input 5 to Output 11.

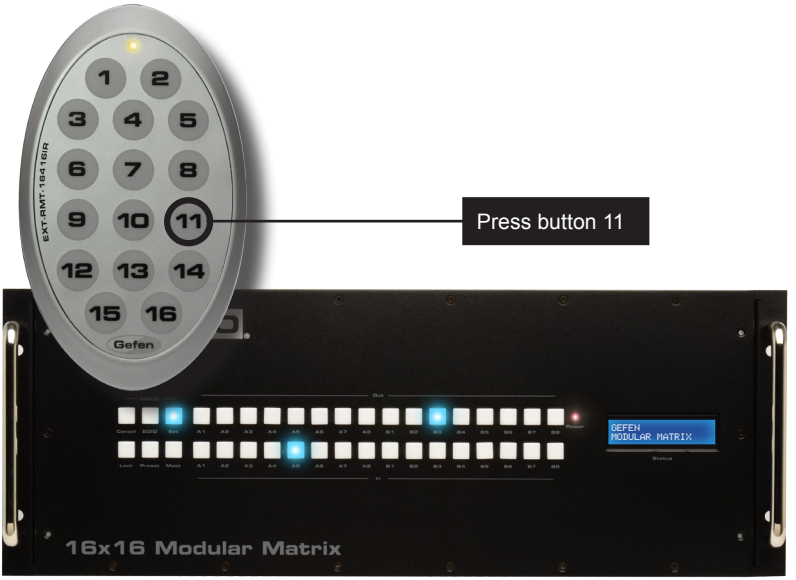
1. Point the IR remote at the IR sensor on the front panel of the matrix.

2. Select the input by pressing button 5 on the IR remote control unit. The LED on the IR remote control unit will flash bright yellow to indicate that a button was pressed.

3. The **Set** button will glow bright blue.



4. Next, press the button for the desired output. In this example, we want to route Input 5 to Output 11. Therefore, press button 11 on the IR remote control unit.



Input 5 has now been routed to Output 11.

5. After a few moments, the Set button and the associated buttons for the routed input and output will turn off.

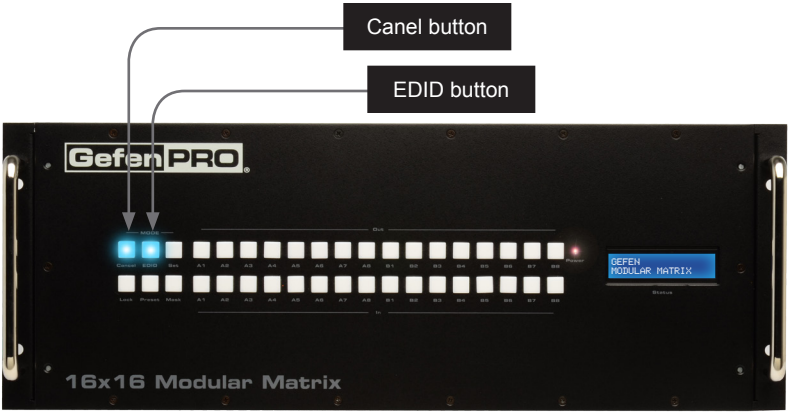
Using the IR Extender

There may be situations where the IR sensor is blocked by a cabinet or other mounting device. In this case, an IR extender (Gefen part no. EXT-RMT-EXTIR) can be connected to the IR port on the back of the matrix (see the section Back Panel). The sensor on the IR extender behaves exactly like the sensor on the front panel of the matrix.

Resetting the Matrix

The 16x16 Modular Matrix can be restored to the factory-default settings. When the matrix is reset, all TCP/IP/UDP settings will be restored to the default settings. In addition, the matrix will be reset to a “1-to-1” routing state (Input 1 > Output 1, Input 2 > Output 2, and so on).

1. From the home screen, press and hold the **EDID** and **Cancel** buttons for 3 seconds.



2. Release the **EDID** and **Cancel** buttons when the following screen is displayed:

3. After a few seconds, the home screen will be displayed.

16 SOURCES x 16 DISPLAYS | Modular Matrix

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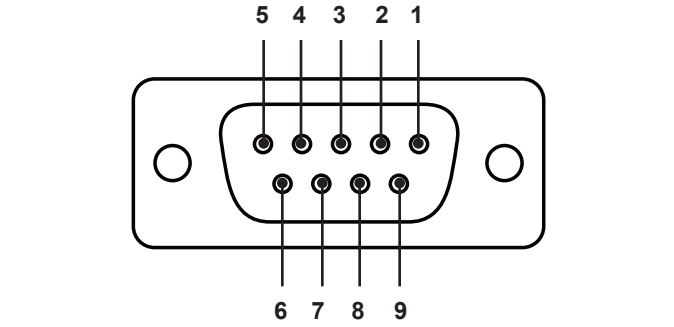
RS-232 and IP Configuration

RS-232 Interface



Only TXD, RXD, and GND pins are used.

RS-232 Settings

Description	Setting
Baud rate	19200
Data bits	8
Parity	None
Stop bits	1
Hardware flow control	None

IMPORTANT: When sending RS-232 commands, a carriage return must be included at the end of the command. A space *must* be included between the command and the parameter.

IP / UDP Configuration

The *16x16 Modular Matrix* supports IP-based control using Telnet, UDP, or the built-in Web-based GUI. To set up IP control, the network settings for the *16x16 Modular Matrix* must be configured via RS-232. The default network settings for the matrix are as follows:

Description	IP Address / Port	Description	IP Address / Port
IP Address	192.168.1.72	UDP Port	23
Subnet	255.255.255.0	Local UDP Port	50008
Gateway	192.168.1.254	Remote UDP IP	192.168.1.80
HTTP Port	80	Remote UDP Port	50007

1. Connect an RS-232 cable from the PC to the *16x16 Modular Matrix*. Also make sure that an Ethernet cable is connected between the matrix and the network.

2. Launch a terminal emulation program (e.g. HyperTerminal) and use the RS-232 settings listed on the previous page.

> **NOTE:** Depending upon the network, all related IP, Telnet, and UDP settings will need to be assigned. Consult your network administrator to obtain the proper settings.

3. Set the IP address for the matrix using the `#sipadd` command.

4. Set the subnet mask using the `#snetmask` command.

5. Set the gateway (router) IP address using the `#sgateway` command.

6. Set the Telnet listening port using the `#set_tcp_term_port` command.

7. Set the HTTP listening port using the `#set_http_port` command.

8. Set the UDP remote IP address for the matrix using the `#set_udp_rip` command.

9. Set the UDP listening port for the matrix using the `#set_udp_port` command.

10. Set the UDP remote port for the matrix using the `#set_udp_rport` command.

11. Reboot the matrix to apply all changes, then type the IP address that was specified in step 3, in a Web browser to access the Web GUI. Use the same IP address to Telnet to the matrix.

RS-232 / IP Commands

EDID Management

Command	Description
#edidbatolo	Read downstream EDID and stores in any Local Input
#ediddetolo	Set to default EDID on Local Input
#ediddstoba	Read downstream EDID and stores in EDID Bank
#ediddstolo	Read downstream EDID and stores into a Local EDID
#lock_edid	Locks Local EDID and disables auto-loading after power-up
#loedidtoba	Loads Local EDID to the specified EDID bank
#ediddetolo	Loads EDID to Local EDID
#prbaedid	Read downstream EDID from bank and sends to serial port
#prdsedid	Read downstream EDID and sends to serial port
#predidst	Spools the EDID details to the serial port
#prloedid	Read Input Local EDID and sends to serial port
#set_bank_name	Set the name of the specified EDID bank
#show_bank_name	Displays the name of the specified EDID bank

#edidbatolo

The #edidbatolo command loads the EDID from the specified EDID bank and writes it to the specified input(s). At least one input must be specified. If *param2* = 0, then the EDID in the specified bank is copied to all 16 inputs. Only 9 inputs can be specified at a time. Run this command again if additional inputs are required.

Syntax:

```
#edidbatolo param1 param2 [... param9]
```

Parameters:

param1	EDID bank offset	[1 ... 20]
param2 - param9	Input list	[1 ... 16]

(continued on next page)

Examples:

```
#edidbatolo 2 3 6 7

Loading EDID bank 2 to locals Inputs: 3 6 7, please wait.....
Finished Loading

#edidbatolo 5 0

Loading EDID bank 5 to all locals Inputs, please wait.....
Finished Loading
```

#ediddetolo

The `#ediddetolo` command stores the default (Internal) EDID to the specified input(s). At least one input must be specified. If *param2* = 0, then the EDID in the specified bank is copied to all 16 inputs. Only 9 inputs can be specified at a time. Run this command again if additional inputs are required.

Syntax:

```
#ediddetolo param1 [... param9]
```

Parameters:

param1 - param16	Input	[1 ... 16]

Examples:

```
#ediddetolo 5 6 7

Loading default EDID to locals Inputs: 5 6 7, please wait.....
Finished Loading

#ediddetolo 0

Loading default EDID to all locals Inputs, please wait.........
Finished Loading
```

#ediddstoba

The #ediddstoba command reads the downstream EDID and stores it to the specified EDID bank.

Syntax:

```
#ediddstoba param1 param2
```

Parameters:

param1	Output	[1 ... 16]
param2	EDID bank	[1 ... 20]

Examples:

```
#ediddstoba param1 param2
Loading Downstream EDID 25 to EDID bank 20, please wait....
Finished Loading
```

#ediddstolo

The #ediddstolo command reads the downstream EDID and stores it to a Local EDID.
If *param2* = 0, then the EDID in the specified bank is copied to all 16 inputs. At least one input must be specified. Only 9 inputs can be specified at a time. Run this command again if additional inputs are required.

Syntax:

```
#ediddstolo param1 param2 [...param9]
```

Parameters:

param1	Output	[1 ... 16]
param2	Input	[1 ... 16]

Example:

```
#ediddstola 15 6 7
Loading Downstream EDID 15 to locals Inputs: 6 7, please wait....
Finished Loading
```

#lock_edid

The `#lock_edid` command secures the EDID stored on all inputs. This prevents the default EDID from being loaded to all inputs during a power-up procedure. This feature can be enabled or disabled.

Syntax:

```
#lock_edid param1
```

Parameters:

param1 Value [0 ... 1]

Value	Description
0	Disable Lock EDID
1	Enable Lock EDID

#loedidtoba

The `#loedidtoba` command loads an EDID file and stores it in the specified EDID bank.

Syntax:

```
#loedidtoba param1
```

Parameters:

param1 EDID bank [1 ... 20]

Example:

```
#loedidtoba 8
==============================
 Download EDID bin file___1
 cancel_____________________0
==============================
Please send EDID bin file
Waiting for the file to be sent ... (press 'a' to abort)
```

#loedidtolo

The `#loedidtolo` command loads an EDID file and stores it in the specified input.
If *param1* = 0, then the downstream EDID is stored in all 16 inputs.

Syntax:

```
#loedidtolo param1
```

Parameters:

param1	Input	[1 ... 16]

Example:

```
#loedidtolo 8

==============================
 Download EDID bin file___1
 cancel_____________________0
==============================
Please send EDID bin file
Waiting for the file to be sent ... (press 'a' to abort)
```

#prbaedid

The #prbaedid command displays the EDID stored in the specified EDID bank.

Syntax:

```
#prbaedid param1
```

Parameters:

param1	EDID bank	[1 ... 20]

Example:

```
#prbaedid 11
Print the Bank EDID 11 on terminal screen

0x00 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0x00
0x10 0xAC 0x35 0x40 0x4C 0x32 0x33 0x32
0x31 0x13 0x01 0x03 0x80 0x41 0x29 0x78
0xEA 0x8F 0x95 0xAD 0x4F 0x32 0xB2 0x25
0x0F 0x50 0x54 0xA5 0x4B 0x00 0x81 0x80
0xA9 0x40 0xD1 0x00 0xD1 0x40 0x71 0x4F
0x81 0x00 0xB3 0x00 0x01 0x01 0xB0 0x68
0x00 0xA0 0xA0 0x40 0x2E 0x60 0x30 0x20
0x36 0x00 0x81 0x90 0x21 0x00 0x00 0x1E
0x00 0x00 0x00 0xFF 0x00 0x47 0x35 0x30
0x31 0x48 0x39 0x43 0x32 0x32 0x33 0x32
0x4C 0x0A 0x28 0x3C 0x80 0xA0 0x70 0xB0
0x23 0x40 0x30 0x20 0x36 0x00 0x81 0x91
0x21 0x00 0x00 0x1C 0x00 0x00 0x00 0xFD
0x00 0x31 0x56 0x1D 0x71 0x1C 0x00 0x0A
0x20 0x20 0x20 0x20 0x20 0x20 0x00 0x41
```

#prdsedid

The `#prdsedid` command displays the EDID stored in the specified EDID bank.

Syntax:

```
#prdsedid param1
```

Parameters:

param1	Output	[1 ... 16]

Example:

```
#prdsedid 8
Print the Downstream EDID 8 on terminal screen,, please wait...

0x00 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0x00
0x10 0xAC 0x35 0x40 0x4C 0x32 0x33 0x32
0x31 0x13 0x01 0x03 0x80 0x41 0x29 0x78
0xEA 0x8F 0x95 0xAD 0x4F 0x32 0xB2 0x25
0x0F 0x50 0x54 0xA5 0x4B 0x00 0x81 0x80
0xA9 0x40 0xD1 0x00 0xD1 0x40 0x71 0x4F
0x81 0x00 0xB3 0x00 0x01 0x01 0xB0 0x68
0x00 0xA0 0xA0 0x40 0x2E 0x60 0x30 0x20
0x36 0x00 0x81 0x90 0x21 0x00 0x00 0x1E
0x00 0x00 0x00 0xFF 0x00 0x47 0x35 0x30
0x31 0x48 0x39 0x43 0x32 0x32 0x33 0x32
0x4C 0x0A 0x28 0x3C 0x80 0xA0 0x70 0xB0
0x23 0x40 0x30 0x20 0x36 0x00 0x81 0x91
0x21 0x00 0x00 0x1C 0x00 0x00 0x00 0xFD
0x00 0x31 0x56 0x1D 0x71 0x1C 0x00 0x0A
0x20 0x20 0x20 0x20 0x20 0x20 0x00 0x41
```

#predidst

The #predidst command displays the EDID used by each input.

Syntax:

```
#predidst param1
```

Parameters:

None

Example:

```
#predidst

EDID table
Input| Source |ID  |Monitor name
    1| Default|GFN |GEFEN_XPT_SL
    2| Default|GFN |GEFEN_XPT_SL
    3| Bank  2|MEI |PanasonicTV0
    4| Bank  2|MEI |PanasonicTV0
    5| Bank  2|MEI |PanasonicTV0
    6|   25   |DEL |
    7|   25   |DEL |
    8| Bank  2|MEI |PanasonicTV0
    9| Bank  2|MEI |PanasonicTV0
   10| Bank  2|MEI |PanasonicTV0
   11| Default|GFN |GEFEN_XPT_SL
   12| Default|GFN |GEFEN_XPT_SL
   13| Default|GFN |GEFEN_XPT_SL
   14| Default|GFN |GEFEN_XPT_SL
   15| Default|GFN |GEFEN_XPT_SL
   16| Default|GFN |GEFEN_XPT_SL
```

#prloedid

The #prloedid command displays the EDID stored in the specified input.

Syntax:

```
#prloedid param1
```

Parameters:

param1	Input	[1 ... 16]

Example:

```
#prloedid 3

Print the local Input 3 on terminal screen, please wait....
0x00 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0x00
0x34 0xA9 0xAF 0xA0 0x01 0x01 0x01 0x01
0x00 0x14 0x01 0x03 0x80 0x00 0x00 0x78
0x0A 0xDA 0xFF 0xA3 0x58 0x4A 0xA2 0x29
0x17 0x49 0x4B 0x00 0x00 0x00 0x01 0x01
0x01 0x01 0x01 0x01 0x01 0x01 0x01 0x01
0x01 0x01 0x01 0x01 0x01 0x01 0x02 0x3A
0x80 0x18 0x71 0x38 0x2D 0x40 0x58 0x2C
0x45 0x00 0xBA 0x88 0x21 0x00 0x00 0x1E
0x01 0x1D 0x80 0x18 0x71 0x1C 0x16 0x20
0x58 0x2C 0x25 0x00 0xBA 0x88 0x21 0x00
0x00 0x9E 0x00 0x00 0x00 0xFC 0x00 0x50
0x61 0x6E 0x61 0x73 0x6F 0x6E 0x69 0x63
0x54 0x56 0x30 0x0A 0x00 0x00 0x00 0xFD
0x00 0x17 0x3D 0x0F 0x44 0x0F 0x00 0x0A
0x20 0x20 0x20 0x20 0x20 0x20 0x01 0xC7
0x02 0x03 0x2A 0x71 0x49 0x90 0x05 0x20
0x04 0x03 0x02 0x07 0x06 0x01 0x23 0x09
0x07 0x01 0x73 0x03 0x0C 0x00 0x20 0x00
0xB8 0x2D 0x2F 0xC0 0x07 0x81 0x49 0x01
0xFE 0x06 0x08 0x00 0x00 0x00 0xE3 0x05
0x1F 0x01 0x01 0x1D 0x00 0x72 0x51 0xD0
0x1E 0x20 0x6E 0x28 0x55 0x00 0xBA 0x88
0x21 0x00 0x00 0x1E 0x8C 0x0A 0xD0 0x8A
0x20 0xE0 0x2D 0x10 0x10 0x3E 0x96 0x00
0xBA 0x88 0x21 0x00 0x00 0x18 0x8C 0x0A
0xD0 0x8A 0x20 0xE0 0x2D 0x10 0x10 0x3E
0x96 0x00 0x0B 0x88 0x21 0x00 0x00 0x18
0x8C 0x0A 0xA0 0x14 0x51 0xF0 0x16 0x00
0x26 0x7C 0x43 0x00 0xBA 0x88 0x21 0x00
0x00 0x98 0x00 0x00 0x00 0x00 0x00 0x00
0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x76
```

#set_bank_name

The #set_bank_name command sets the name of the specified EDID bank. The bank cannot exceed 20 characters in length. Spaces are not permitted when naming EDID banks. If a space is required, use the underscore ("_") character. Use the #show_bank_name command to display the specified bank name.

Syntax:

```
#set_bank_name param1 param2
```

Parameters:

param1	EDID bank	[1 ... 20]
param2	Name	

Example:

```
#set_bank_name 3 Dell_30"
Dell_30" is assigned to bank 3
```

#show_bank_name

The #show_bank_name command displays the name of the specified EDID bank. Use the #set_bank_name command to set the name of the EDID bank.

Syntax:

```
#set_bank_name param1 param2
```

Parameters:

param1	EDID bank	[1 ... 20]

Example:

```
#show_bank_name 3
Bank 3 - Dell_30"
```

IP Configuration

Command	Description
#ipconfig	Displays the current IP configuration
#resetip	Resets the IP configuration to factory-default settings
#set_http_port	Sets the Web server listening port
#set_tcp_term_pass	Sets the TCP terminal password
#set_tcp_term_port	Sets the TCP terminal port
#set_udp_port	Sets the local UDP port
#set_udp_rip	Sets the remote UDP IP address
#set_udp_rport	Sets the remote UDP port
#sgateway	Sets the IP address of the (router) gateway
#show_tcp_term_pass	Displays the current TCP terminal password
#sipadd	Sets the IP Address
#snetmask	Sets the Net Mask
#use_tcp_term_pass	Enables / disabled login credentials
#use_udp_access	Enables / disabled UDP access
#show_user_name	Displays the current TCP user name

#ipconfig

The #ipconfig command displays the current TCP/IP/UDP settings.

Syntax:

```
#ipconfig
```

Parameters:

None

Example:

```
#ipconfig
-------------- TCP/IP settings -------------
MAC add  = 00:1C:91:02:80:2B
IP add   = 192.168.1.205
Net Mask = 255.255.255.0
...
...
```

#resetip

The `#resetip` command resets the IP configuration to factory-default settings. The matrix must be rebooted after executing this command.

Syntax:

```
#resetip
```

Parameters:

None

#set_http_port

The `#set_http_port` command specifies the Web server listening port. The matrix must be rebooted after executing this command. The default port setting is 80.

Syntax:

```
#set_http_port param1
```

Parameters:

param1	Port	[1 ... 65535]

Example:

```
#set_http_port 82
New HTTP port set to: 82
```

#set_tcp_term_pass

The `#set_tcp_term_pass` command sets the TCP terminal password. The default password is `Admin`. The matrix must be rebooted after executing this command. The password cannot exceed 20 characters in length.

Syntax:

```
#set_tcp_term_pass param1 param2 param3
```

Parameters:

param1	Old password
param2	New password
param3	New password (confirmation)

Example:

```
#set_tcp_term_pass Admin reindeer reindeer
TCP Terminal password updated to: reindeer
```

#set_tcp_term_port

The `#set_tcp_term_port` command sets the TCP terminal server listening port. The default port setting is 23. The matrix must be rebooted after executing this command.

Syntax:

```
#set_tcp_term_port param1
```

Parameters:

param1	Port	[1 ... 65535]

Example:

```
#set_tcp_term_port 21
New TCP Terminal port set to: 21
```

#set_udp_port

The `#set_udp_port` command sets the local UDP server listening port. The default port setting is 21. The matrix must be rebooted after executing this command.

Syntax:

```
#set_udp_port param1
```

Parameters:

param1	Port	[1 ... 65535]

Example:

```
#set_udp_port 56
New UDP server port set to: 56
```

#set_udp_rip

The `#set_udp_rip` command sets the remote UDP listening IP address. The IP address must be specified using dot-decimal notation. The default UDP remote IP address is `192.168.1.255`. The matrix must be rebooted after executing this command.

Syntax:

```
#set_udp_rip param1
```

Parameters:

param1	IP address

Example:

```
#set_udp_rip 192.168.1.227
New Remote UDP IP set to: 192.168.1.227
```

#set_udp_rport

The `#set_udp_rport` command sets the remote UDP listening port. The default UDP remote port is 50008. The matrix must be rebooted after executing this command.

Syntax:

```
#set_udp_rport param1
```

Parameters:

param1	Port	[1 ... 65535]

Example:

```
#set_udp_rport 1024
New UDP Remote port set to: 1024
```

#sgateway

The `#sgateway` command sets the new IP gateway. The gateway must be typed using dot-decimal notation. The default gateway is `192.168.1.254`. The matrix must be rebooted after executing this command.

Syntax:

```
#sgateway param1
```

Parameters:

param1	Gateway

Example:

```
#sgateway 192.168.1.1
New IP Gateway set to: 192.168.1.1
```

#show_tcp_term_pass

The #show_tcp_term_pass command displays the current TCP terminal password. Use the #set_tcp_term_pass command to set the password.

Syntax:

```
#show_tcp_term_pass
```

Parameters:

None

Example:

```
#show_tcp_term_pass
TCP Terminal password: reindeer
```

#show_user_name

The #show_user_name command displays the TCP terminal user name for the current session.

Syntax:

```
#show_user_name
```

Parameters:

None

Example:

```
#show_user_name
TCP Terminal login: Administrator
```

#sipadd

The #sipadd command sets the IP address of the matrix. The IP address must be entered using dot-decimal notation. The matrix must be rebooted after executing this command.

Syntax:

```
#sipadd param1
```

Parameters:

param1	IP address

Example:

```
#sipadd 192.168.1.127
New IP set to: 192.168.1.127
```

#snetmask

The #snetmask command sets the subnet mask. The net mask must be entered using dot-decimal notation. The matrix must be rebooted after executing this command.
The default net mask is 255.255.255.0

Syntax:

```
#snetmask param1
```

Parameters:

param1	Gateway

Example:

```
#snetmask 255.255.0.0
New IP mask set to: 255.255.0.0
```

#use_tcp_term_pass

The `#use_tcp_term_pass` command enables or disables the login credentials when starting a terminal session.

Syntax:

```
#use_tcp_term_pass param1
```

Parameters:

param1 Value [0 ... 1]

Value	Description
0	Disable password prompt
1	Enable password prompt

Example:

```
#use_tcp_term_pass 1
TCP Terminal password at login is set to ON
```

#use_udp_access

The `#use_udp_access` command enables or disables UDP access mode.

Syntax:

```
#use_udp_access param1
```

Parameters:

param1 Value

Value	Description
0	Disable UDP
1	Enable UDP

Example:

```
#use_udp_access 1
UDP Access is set to Enabled
```

Routing and Masking

Command	Description
#callpreset	Restores the specified routing / masking preset
#maskout	Masks the specified outputs
#prpreset	Displays the current list of presets
#savepreset	Saves the current routing / masking preset
#set_input_name	Assigns an input with the specified name
#set_output_name	Assigns an output with the specified name
#set_preset_name	Assigns a preset with the specified name
#show_input_name	Displays the specified input name
#show_output_name	Displays the specified output name
#show_preset_name	Displays the specified preset name
#unmaskout	Unmasks the specified outputs
m	Displays the current matrix status in tabular form
r	Routes the specified input to the specified outputs
s	Routes the specified inputs to all outputs

#callpreset

The #callpreset command restores the specified routing / masking preset. If the specified preset is empty, then Empty Set will be returned.

Syntax:

```
#callpreset param1
```

Parameters:

param1	Preset	[1 ... 16]

Example:

```
#callpreset 2
Recalling the saved routing state from preset 2
```

#maskout

The `#maskout` command masks the specified outputs. If *param2* = 0, then all outputs will be masked. At least one output must be specified. No more than 9 outputs can be specified at a time. Run this command again if additional outputs require masking.

Syntax:

```
#maskout param1 [... param9]
```

Parameters:

param1	Output	[1 ... 16]

Example:

```
#maskout 2 3 4
Masked Outputs: 2 3 4

#maskout 0
Masked all Outputs
```

#prpreset

The #prpreset command displays the current list of presets in tabular form.

Syntax:

#prpreset

Parameters:

None

Example:

```
#prpreset
Preset table

Set | Outputs 1-16
  1  | M 2 A 2 A 3 A 4 M 5 A 6 A 7 A 8 A 9 M10 M11 A12 A13 A14 A15 A16
     | A14 A13 A11 A10 A12 A12 A13 A14 A10 A10 A10 A12 A12 A15 A10 A12
  2  | A11 A 2 A 3 A 4 A 5 A 6 A 7 A 8 A 9 A10 A11 A12 A13 A14 A15 A16
     | A13 A14 A15 A14 A15 A13 A12 A10 A17 A11 A12 A13 A14 A15 A16 A17
  3  | A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0
     | A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0
  4  | A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0
     | A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0
  5  | A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0
     | A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0
  6  | A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0
     | A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0
  7  | A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0
     | A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0
  8  | A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0
     | A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0
...
...
...
 15  | A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0
     | A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0
 16  | A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0
     | A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0 A 0
```

#savepreset

The #savepreset command saves the current routing and masking state to a specified preset. To restore a saved preset, use the #callpreset command.

Syntax:

```
#savepreset param1
```

Parameters:

param1	Preset	[1 ... 16]

Example:

```
#savepreset 2
Current routing state is saved to preset
```

#set_input_name

The #set_input_name command names the specified input. The name of the input cannot exceed 20 characters in length. Spaces are not permitted when naming outputs. If a space is required, use the underscore ("_") character.

Syntax:

```
#set_input_name param1 param2
```

Parameters:

param1	Input	[1 ... 16]
param2	Name	

Example:

```
#set_input_name 12 signal_generator
signal_generator is assigned to input 12
```

#set_output_name

The `#set_output_name` command names the specified output. The name of the output cannot exceed 20 characters in length Spaces are not permitted when naming outputs. If a space is required, then use the underscore ("_") character.

Syntax:

```
#set_output_name param1 param2
```

Parameters:

param1	Output	[1 ... 16]
param2	Name	

Example:

```
#set_output_name 15 Dell_24
Dell_24 is assigned to output 15
```

#set_preset_name

The `#set_preset_name` command names the specified preset. The name of the preset cannot exceed 20 characters in length Spaces are not permitted when naming presets. If a space is required, then use the underscore ("_") character.

Syntax:

```
#set_preset_name param1 param2
```

Parameters:

param1	Preset	[1 ... 16]
param2	Name	

Example:

```
#set_preset_name 2 Studio51
Studio51 is assigned to preset 2
```

#show_input_name

The `#show_input_name` command displays the name of the specified input.

Syntax:

```
#show_input_name param1
```

Parameters:

param1	Input	[0 ... 16]

Example:

```
#show_input_name 12
Input 12 - signal_generator
```

#show_output_name

The `#show_output_name` command displays the name of the specified output.

Syntax:

```
#show_output_name param1
```

Parameters:

param1	Output	[1 ... 16]

Example:

```
#show_output_name 15
Output 15 - Dell_24
```

#show_preset_name

The `#show_preset_name` command displays the name of the specified preset.

Syntax:

```
#show_preset_name param1
```

Parameters:

param1	Preset	[1 ... 16]

Example:

```
#show_preset_name 2
Preset 2 - Studio51
```

#unmaskout

The `#unmaskout` command unmasks the specified output(s). Multiple outputs can be specified. However, no more than 9 outputs can be specified at a time. If *param1* = 0, then all outputs will be unmasked.

Syntax:

```
#set_output_name param1 [... param9]
```

Parameters:

param1	Output	[1 ... 16]

Example:

```
#unmaskout 4 5 8
Unmasked Outputs: 4 5 8

#unmaskout 0
Unmasked all Outputs
```

m

The m command displays the current matrix status in tabular form. The required DIP switch settings for the IR remote control unit are also displayed, based on the current IR channel of the matrix. Do not precede this command with the "#" symbol.

Syntax:

```
m
```

Parameters:

None

Example:

```
m
Show the matrix status in tabular form
Routing status table
 Outputs | +0 | +1 | +2 | +3 | +4 | +5 | +6 | +7
    1    |  8 |  2 |  8 |  2 |  8 |  7 |  2 |  2
    9    |  3 |  2 |  1 |  2 |  6 |  1 |  1 |  4
Masking status table
 Outputs | +0 | +1 | +2 | +3 | +4 | +5 | +6 | +7
    1    |  A |  A |  A |  A |  A |  A |  A |  A
    9    |  A |  A |  A |  A |  A |  A |  A |  A
Monitor HPD status table
 Outputs | +0 | +1 | +2 | +3 | +4 | +5 | +6 | +7
    1    |  H |  L |  H |  H |  L |  L |  L |  L
    9    |  L |  L |  L |  L |  L |  L |  L |  L
RMT_IR - SW1=0,SW2=0
```

r

The r command routes the specified input to the specified outputs. Up to eight outputs can be specified at a time. Do not precede this command with the "#" symbol. If *param2* = 0, then the specified input will be routed to all outputs. Also see the s command.

Syntax:

```
r param1 param2 [... param9]
```

Parameters:

param1	Input	[1 ... 16]
param2	Output	[1 ... 16]

Example:

```
r 1 2 3 7 8 9
Input 1 is routed to Outputs: 2 3 7 8 9


r 5 0
Input 5 is routed to all Outputs
```

s

The s command routes the specified inputs to all outputs. Do not precede this command with the "#" symbol. If *param1* = 0, then the matrix will be placed in a 1-to-1 routing state. In other words, Input 1 is routed to Output 1, Input 2 is routed to Output 2, and so on.

Syntax:

```
s param1
```

Parameters:

param1	Input	[1 ... 16]

Example:

```
s 2
Input 2 is routed to all Outputs


s 0
Routing 1-1,2-2,...
```

System

Command	Description
#factory_reset	Resets the matrix to factory-default settings
#fadefault	Resets the routing and masking to factory-default settings
#fw_upgrade	Used to update the 16x16 Modular Matrix firmware
#help	Displays a list of available RS-232 / Telnet commands
#hpdto	Cycles with HPD line on the specified output
#lock_fo	Enables / disables the power lock state
#reboot	Reboots the matrix
#set_ir	Sets the IR channel of the matrix
#show_temp	Displays the temperature of each board within the matrix
#show_ver_data	Displays the current hardware and firmware version
#show_voltage	Displays the input and output board voltages
f	Enables / disables the +5V on the specified input

#factory_reset

The #factory_reset command resets the matrix to factory-default settings.

Syntax:

```
#factory_reset
```

Parameters:

None

Example:

```
#factory_reset

IP configuration reset to factory default
Reset to factory default, Please wait
Routing 1-1,2-2,...
Unmasked all Outputs

Loading default EDID to all locals Inputs, please wait.........
Finished Loading
```

#fadefault

The #fadefault command resets the routing and masking to factory-default settings. This command is similar to the #factory_reset command, except that TCP/IP settings are preserved.

Syntax:

```
#fadefault
```

Parameters:

None

Example:

```
#fadefault
Reset to factory default, Please wait
Routing 1-1,2-2,...
Unmasked all Outputs

Loading default EDID to all locals Inputs, please wait........
Finished Loading
```

#fw_upgrade

The #fw_upgrade command is used to update the 16x16 Modular Matrix firmware. See the Firmware Upgrade Procedure (page 107) for details on using this command.

Syntax:

```
#fw_upgrade
```

Parameters:

None

Example:

See the Firmware Upgrade Procedure (page 107).

#help

The #help command displays the list of available RS-232 / IP commands. The #help command can also be used to provide help on a specific command.

Syntax:

```
#help [param1]
```

Parameters:

param1	Command (optional)

Notes:

When asking for help on a specific command, the "#" character must be included as part of the command.

Example:

```
#help #maskout

Cmd #maskout: Mask outputs
Syntax: #maskout param1..param8
Param1 = 0 (All outputs)
Param1..Param8 = 1-16 (Outputs)
 e.g: #maskout 5 6 7


#help

Available cmds:

#help
#ipconfig
#sipadd
#snetmask
#sgateway
#set_http_port
#set_tcp_term_port
#set_udp_port
#show_user_name
#show_tcp_term_pass
#set_tcp_term_pass
...
...
#fadefault
#factory_reset
#fw_upgrade
```

#hpdto

The `#hpdto` command cycles the HPD line on the specified input. This command is the equivalent of performing a physical hot-plug (disconnecting and reconnecting the input cable) on the source device.

Syntax:

```
#hpdto param1
```

Parameters:

param1	Input	[1 ... 16]

Example:

```
#hpdto 12
HPD cycle on input 12
```

#lock_fo

The `#lock_fo` command enables/disables the power lock state. Enabling this feature will store the +5V status for each input prior to powering-down the matrix. The +5V state is preserved when the matrix is powered.

Syntax:

```
#lock_fo param1
```

Parameters:

None	Value	[0 ... 1]

Value	Description
0	Disable +5V status
1	Enable +5V status

Example:

```
#lock_fo 1
'+5V' on inputs is locked
```

#reboot

The `#reboot` command reboots the matrix. This is the equivalent of physically disconnecting and reconnecting the AC power cord to the matrix. *param1* must be included as part of the command at all times.

Syntax:

```
#reboot param1
```

Parameters:

param1	Constant	10

Example:

```
#reboot 10
The system will reboot itself, please wait

**********************
 GEFEN
 Modular MultiMatrix
 UI FW version: 0.3.38
**********************

Establish connection with Input Board 1
  Board Type: DP input 8 channels
  Board SN: 959793
  FW ver:0.3.8
Establish connection with Input Board 2
  Board Type: DP input 8 channels
  Board SN: 959800
  FW ver:0.3.8
...
...
Establish connection with BP Board
  Board Type: BP 16
  Board SN: 953703
  FW ver:0.3.43

Init Routing, Please wait
.......
Loading Downstream EDID 25 to all locals Inputs, please
wait..........
Finished Loading
```

#set_ir

The #set_ir command sets the IR channel of the matrix. In order for the included IR remote control unit to function correctly with the matrix, both the matrix and the IR remote must share the same IR channel. After executing this command, the DIP switch settings for the included IR remote control unit are returned. See Setting the IR Channel for information on setting the IR channel on the IR remote control unit.

Syntax:

```
#set_ir param1
```

Parameters:

param1	IR channel	[0 ... 3]

Example:

```
#set_ir 2
RMT_IR - SW1=0,SW2=1
```

#show_temp

The #show_temp command displays the temperature of each board within the matrix.

Syntax:

```
#show_temp
```

Parameters:

None

Example:

```
#show_temp
Temperature result [C deg] for UI board:34
Temperature result [C deg] for BP board
sensor1 (Mindspeed) - 47
sensor2 (power)     - 39
Temperature result [C deg] for Inputs board
Board| 1 | 2
    1|42 |34
    2|39 |33
    3|38 |33
    4|37 |35
Temperature result [C deg] for Outputs board
Board| 1 | 2
    1|51 |43
    2|53 |38
    3|52 |38
    4|47 |39
```

#show_ver_data

The `#show_ver_data` command displays the current hardware and firmware version.

Syntax:

```
#show_ver_data
```

Parameters:

None

Example:

```
#show_ver_data
UI Firmware Release version 0.4.7
Release date: Jan 24 2013
Release time: 13:27:36

BP Firmware Release version 0.4.4
Output Firmware Release version:
 1|0.3.13
 2|0.0.0

Input Firmware Release version:
 1|0.3.13
 2|0.0.0
```

#show_voltage

The `#show_voltage` command displays the input and output board voltages.

Syntax:

```
#show_voltage
```

Parameters:

None

Example:

```
#show_voltage
ADC UI measurment result:
VCC CORE 1.8, Value = 1864 mVolt
PSU1 - DS460
PSU1 PSOK, Value = 3058 mVolt
PSU1 Imon, Value = 196 mV -> 2 A

Power results [mV] for BP board
5V  |3.3V|1.2V
5066|3338|1222

Power results [mV] for Outputs boards
Board|1/5  |3.3    |1.8V
    1| 5090|   3350|1813
    2| 5082|   3340|1800

Power results [mV] for Inputs boards
Board|3.3/5|1.2/3.3|1.8V
    1| 5054|   3330|1793
    2| 5090|   3320|1788
```

f

The f command enables / disables the +5V on the specified input. Do not precede this command with the "#" symbol.

Syntax:

```
f param1 param2
```

Parameters:

param1	Input	[1 ... 16]
param2	Value	[0 ... 1]

Value	Description
0	Disable +5V status
1	Enable +5V status

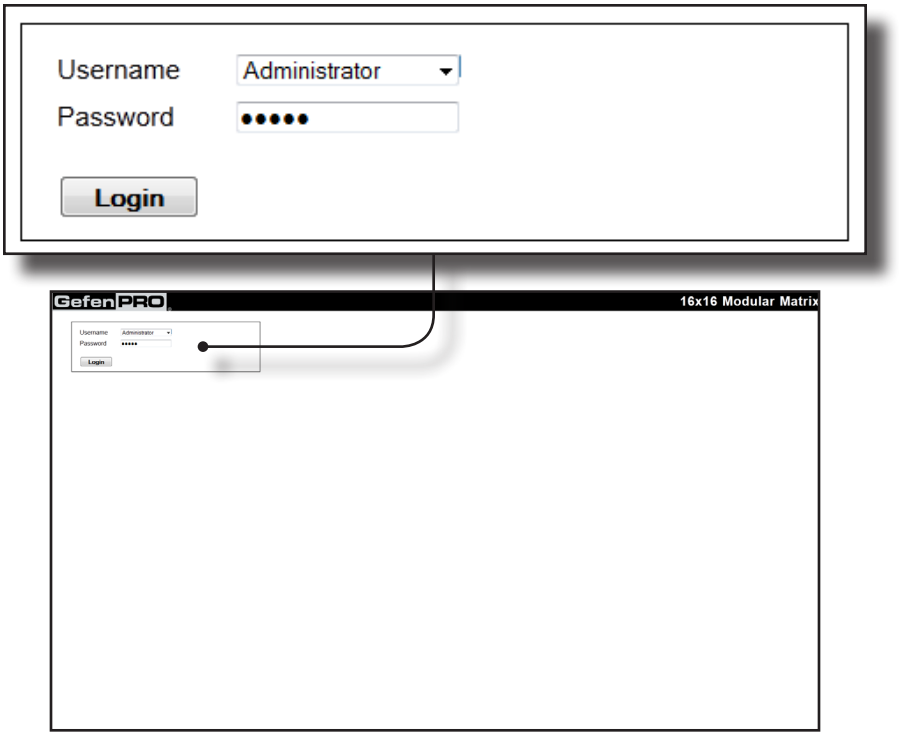
Example:

```
f 5 1
```

Web Interface

Using the built-in Web Server

Access the built-in Web interface by entering the IP address of the matrix that was specified in step 3 under IP / UDP Configuration (page 51). Once connected to the matrix, the login screen will be displayed.



Username
Select the username from the drop-down list.

Options:
`Operator, Administrator`

Administrator login provides unrestricted access to all features and settings. Operator login limits access to matrix routing, display information, and routing preset features.

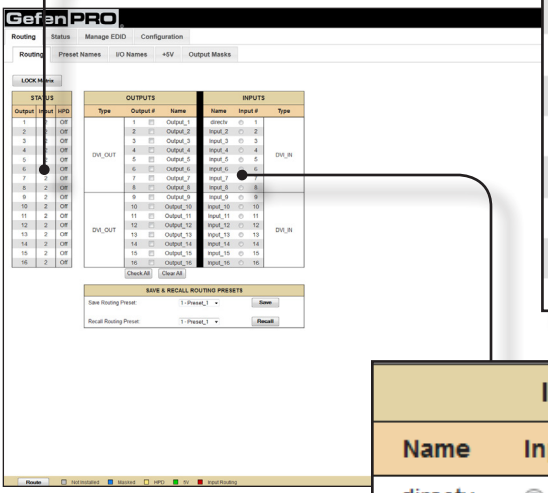
Password
Enter the password for the associated username. The password can be set using the `#set_tcp_term_pass` command.

The Web interface is divided into four main pages: **Routing**, **Status**, **Manage EDID**, and **Configuration**. Each of these pages is represented by a tab. Click on the desired tab to open the its page. Each page also has it's own set of tabs which can be accessed. When the Web interface is opened, the **Routing** page / tab will be displayed.

> **NOTE:** In order to view all four tabs at the top of the screen, the user must be logged in as "Administrator". If logged-in as "Operator", only the **Main** tab will be visible.

Routing ► Routing

Status
Displays the current routing status of the matrix.



STATUS		
Output	Input	HPD
1	2	Off
2	2	Off
3	2	Off
4	2	Off
5	2	Off
6	2	Off
7	2	Off
8	2	Off
9	2	Off

INPUTS		
Name	Input #	Type
directv	1	DVI_IN
Input_2	2	
Input_3	3	
Input_4	4	
Input_5	5	
Input_6	6	
Input_7	7	
Input_8	8	
Input_9	9	

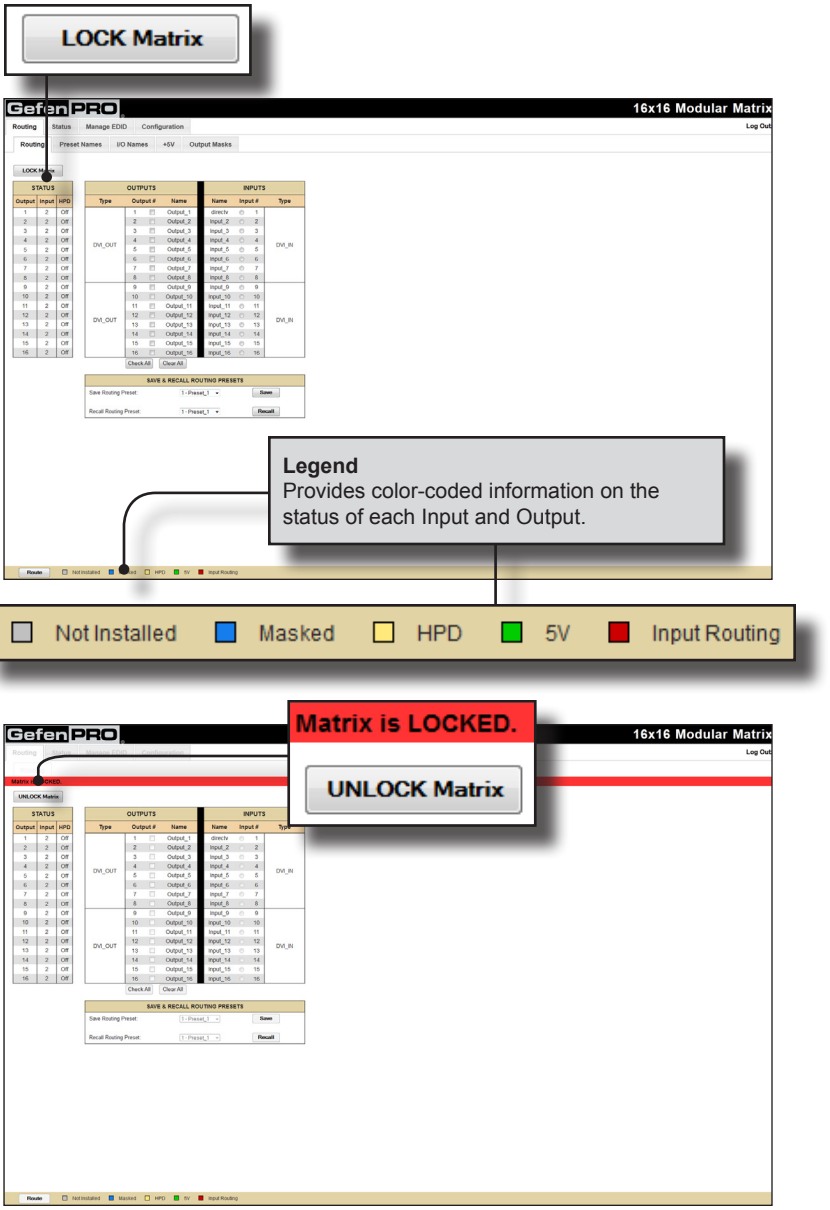
Input #
Click the radio button next to the desired input to be routed. Only one input can be selected at a time.

Name
Displays the current name of the input. The name of each input can be changed. See page 85 for more information.

Type
Indicates the type of input card that is present in the expansion bay.

Lock Matrix

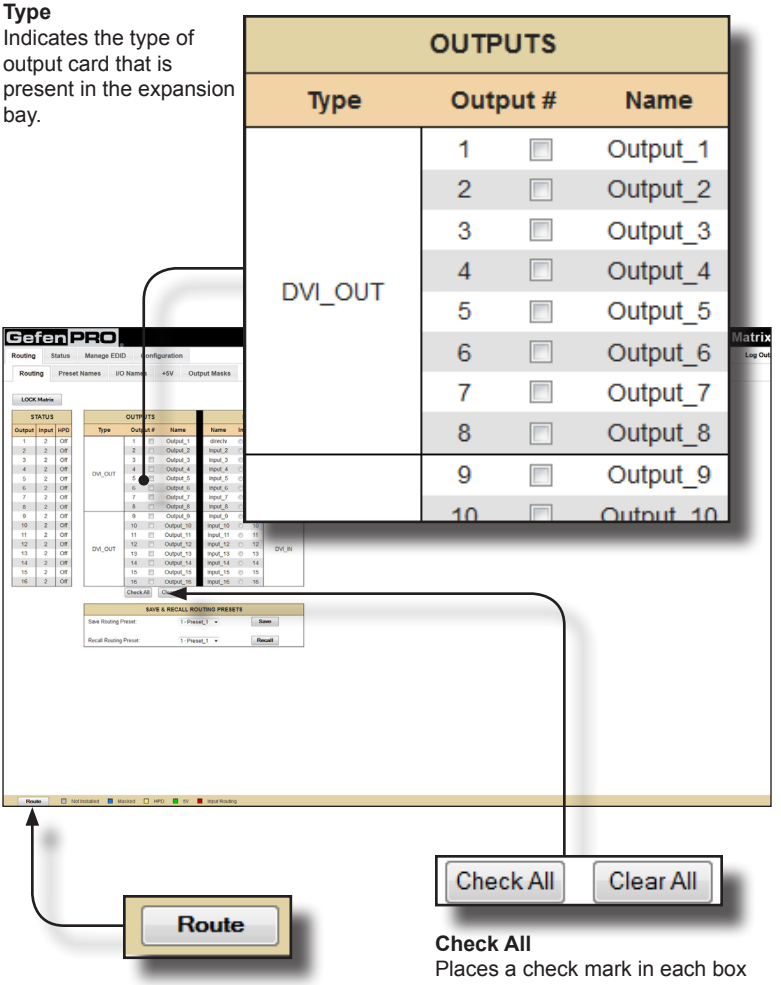
Locks / unlocks the matrix. When the matrix is locked, no modifications can be made using the Web GUI. When the matrix is locked, the button text will read “Unlock Matrix” and a red bar will appear across the top portion of the screen with the text “Matrix is LOCKED”. Click the “Unlock Matrix” button to unlock the matrix.



Name
Displays the current name of each output. The name of each output can be changed. Refer to the `#set_output_name` for details on naming outputs.

Output
Click to place a check mark in the box and select the desired output. Multiple outputs can be selected at a time.

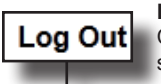
Type
Indicates the type of output card that is present in the expansion bay.



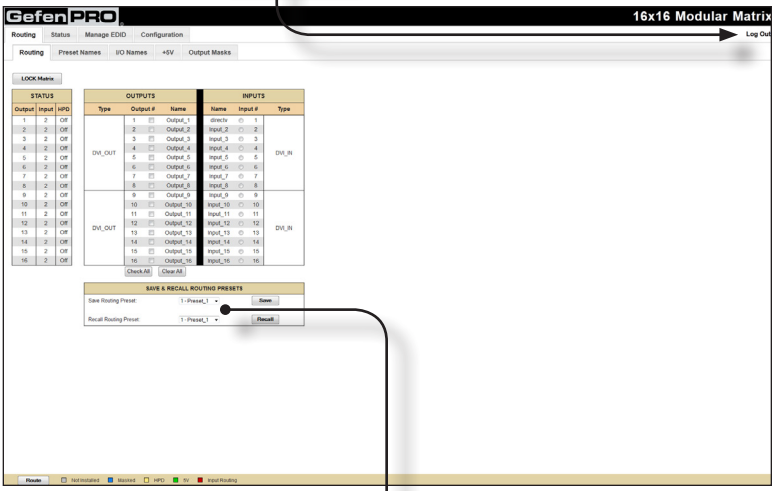
Route
Click this button to route the current input and output selection(s).

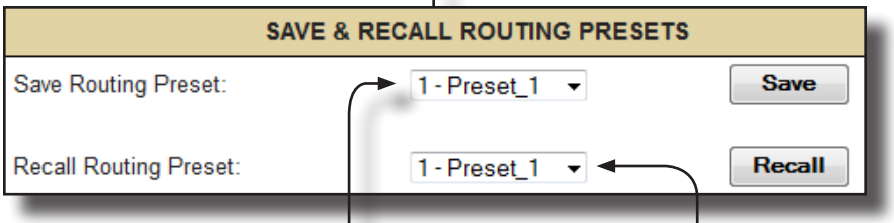
Check All
Places a check mark in each box under the *Output #* column.

Clear All
Clears all check marks from the *Output #* column.



Log Out
Click here to terminate the current Web session are return to the login page.





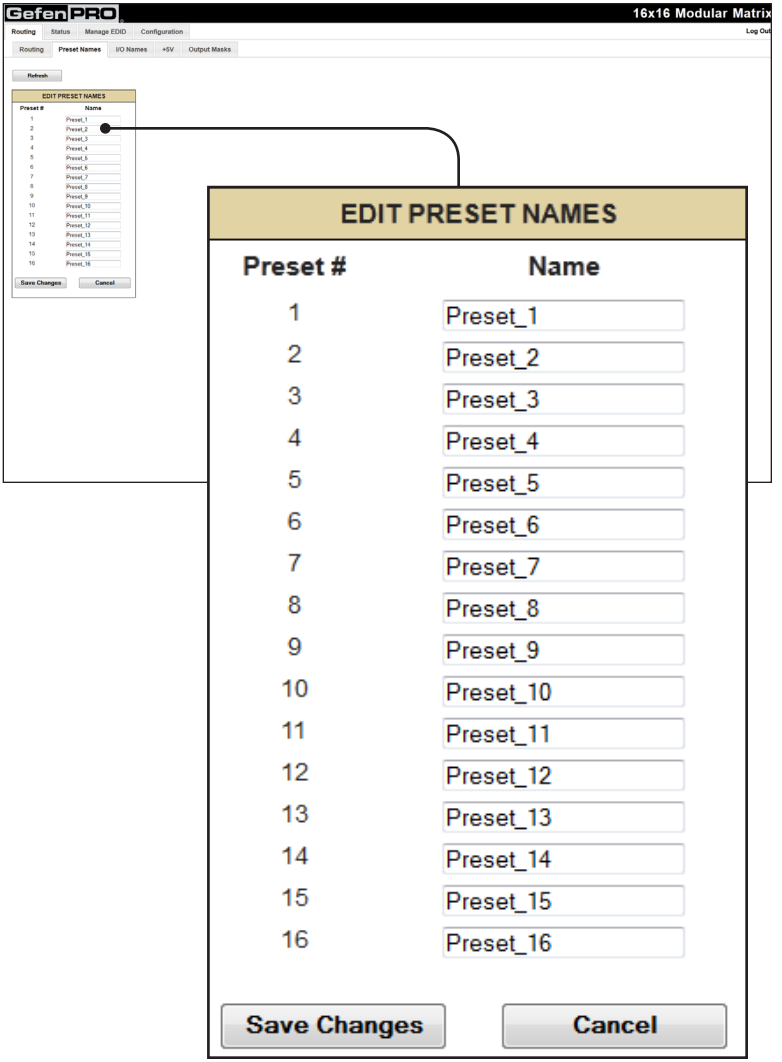
Save Routing Preset
Saves the current routing state to memory. Click the drop-down list to select the desired routing preset.

Click the **Save** button to save the preset to memory.

Recall Routing Preset
Loads the selected routing state into memory. Click the drop-down list to select the desired routing preset.

Click the **Recall** button to load the preset from memory.

Routing ► Preset Names

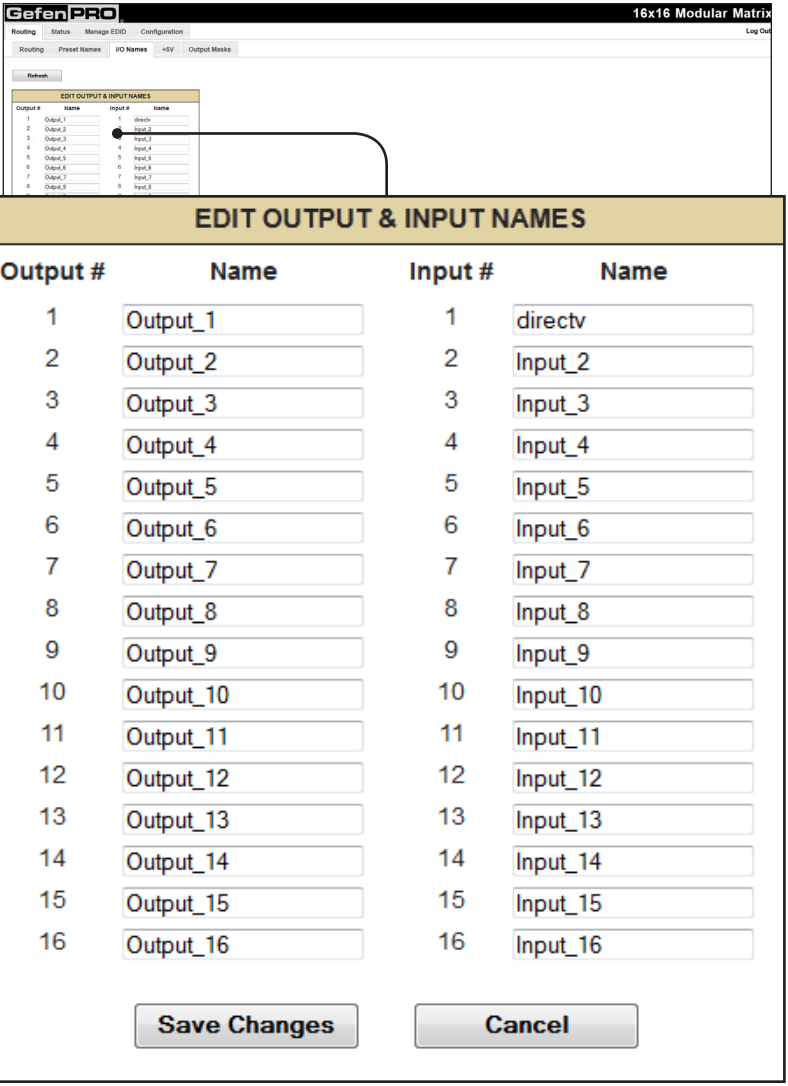


Name
Type the desired name of the Preset in this field.

Save Changes
Click this button to save the Preset Name.

Cancel
Click this button to cancel the name change(s).

Routing ► I/O Names



Name
Type the desired name of each Output or Input in these fields.

Save Changes
Click this button to save the Input / Output name.

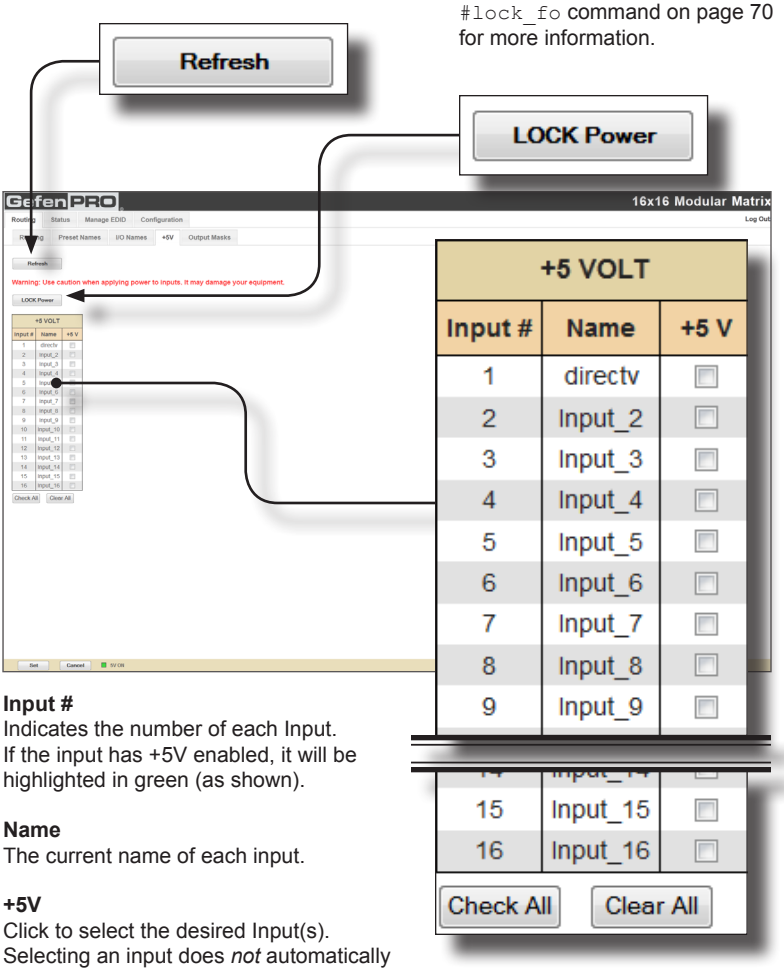
Cancel
Click this button to cancel the name change(s).

Routing ► +5V

WARNING: Use caution when applying power to inputs. If the source device supplies +5V on the input, then enabling the +5V may cause damage to the source and/or the 16x16 Modular Matrix.

Refresh
Updates the Web page to reflect the new Input and/or Output Name.

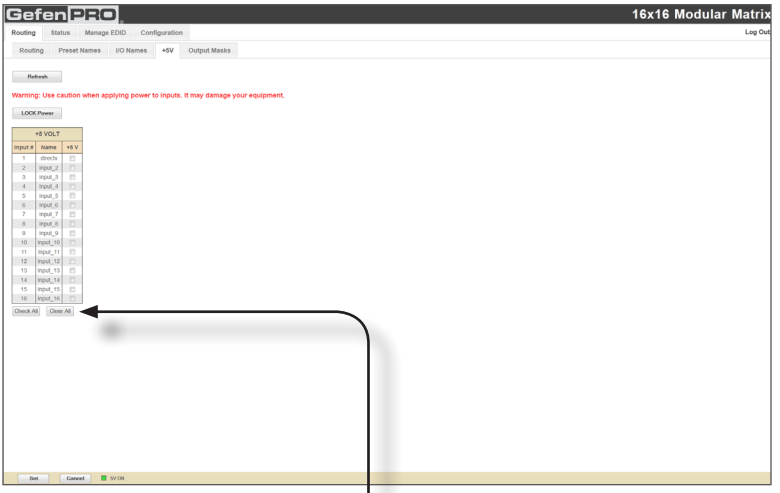
LOCK Power
Enables/disables the power lock state. See the RS-232 command `#lock_fo` command on page 70 for more information.



Input #
Indicates the number of each Input. If the input has +5V enabled, it will be highlighted in green (as shown).

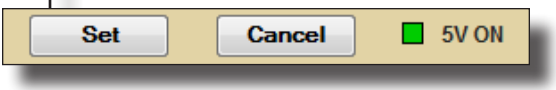
Name
The current name of each input.

+5V
Click to select the desired Input(s). Selecting an input does *not* automatically enable the +5V. Use the **Set** button to enable the +5V (see next page).



Check All
Places a check mark in each box under the +5V column.

Clear All
Clears all check marks from the +5V column.



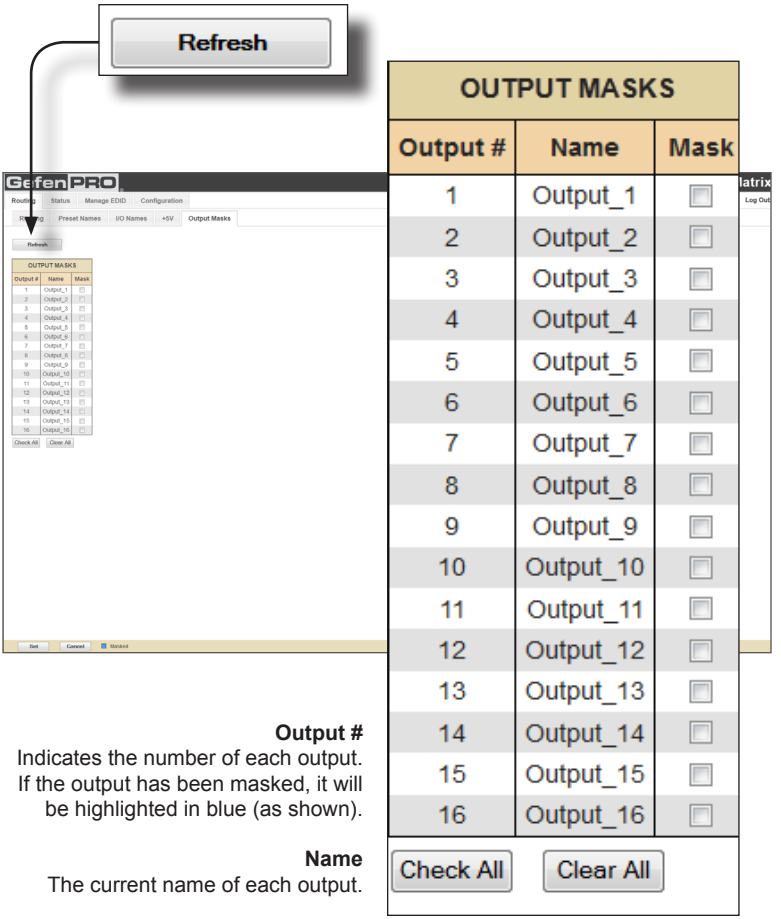
Set
Click this button to enable +5V on the selected input(s). See the previous page for information on selecting inputs.

Cancel
Restores the previous +5V state for each input, if a change was made.

5V ON (legend)
If +5V has been enabled on any of the inputs, these inputs will be highlighted in green. See the previous page for more information.

Routing ► Output Masks

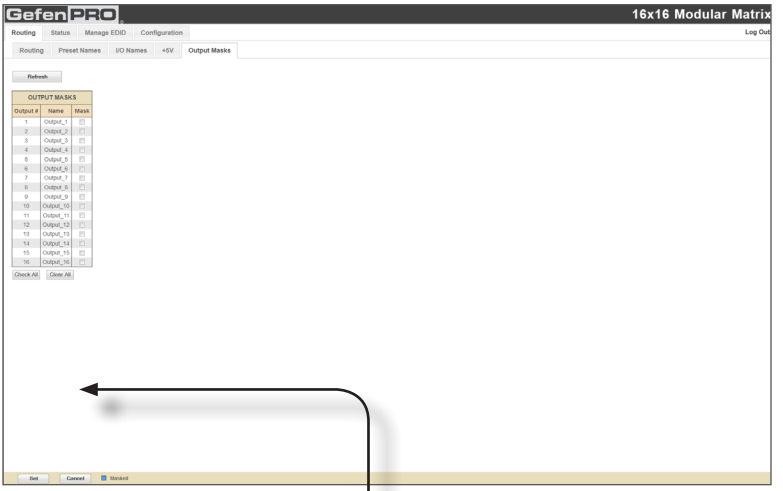
Refresh
Updates the Web page to reflect the new Input and/or Output Name.



Output #
Indicates the number of each output. If the output has been masked, it will be highlighted in blue (as shown).

Name
The current name of each output.

Mask
Click to select the desired Output(s) to be masked. Selecting an output does *not* automatically enable masking. The **Set** button must be used to enable masking. To disable masking, deselect the desired outputs and press the **Set** button.



Check All
Places a check mark in each box under the **Mask** column.

Clear All
Clears all check marks from the **Mask** column.

Set
Click this button to enable masking on the selected output(s). See the previous page for information on selecting inputs.

Cancel
Restores the previous masking state for each output, if a change was made.

Masked (legend)
If masking has been enabled on any of the outputs, then these outputs will be highlighted in blue.

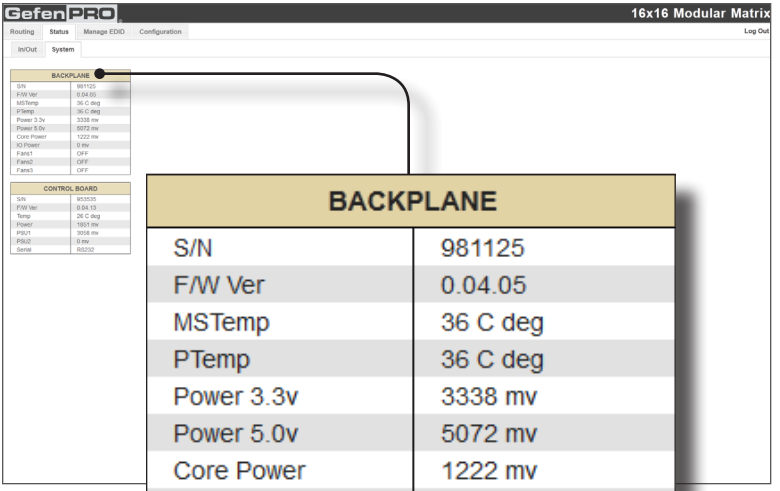
Status ► In / Out

The **In/Out** tab provides information on the hardware and firmware of the 16x16 Modular Matrix. The **OUTPUTS** column lists each Output Card that is installed. The **INPUTS** column lists each Input Card that is installed. The information presented on this screen is used by Gefen Technical Support for troubleshooting purposes, only.

HARDWARE			
OUTPUTS		**INPUTS**	
A		**A**	
S/N	954881	S/N	954850
Type	DVI_OUT	Type	DVI_IN
F/W Ver	0.03.14	F/W Ver	0.03.14
Temp1	32 C deg	Temp1	29 C deg
Temp2	27 C deg	Temp2	24 C deg
Connection	1	Connection	1
Power 3.3v	3340 mv	Power 3.3v	3332 mv
Power 5.0v	5084 mv	Power 5.0v	5050 mv
Power 1.8v	1809 mv	Power 1.8v	1793 mv
B		**B**	
S/N	954883	S/N	954853
Type	DVI_OUT	Type	DVI_IN
F/W Ver	0.03.14	F/W Ver	0.03.14
Temp1	32 C deg	Temp1	28 C deg
Temp2	27 C deg	Temp2	23 C deg
Connection	1	Connection	1
Power 3.3v	3338 mv	Power 3.3v	3320 mv
Power 5.0v	5082 mv	Power 5.0v	5092 mv
Power 1.8v	1805 mv	Power 1.8v	1787 mv

Status ► System

The **System** tab provides additional detailed information on the 16x16 Modular Matrix hardware. The information presented on this screen is used by Gefen Technical Support for troubleshooting purposes, only.



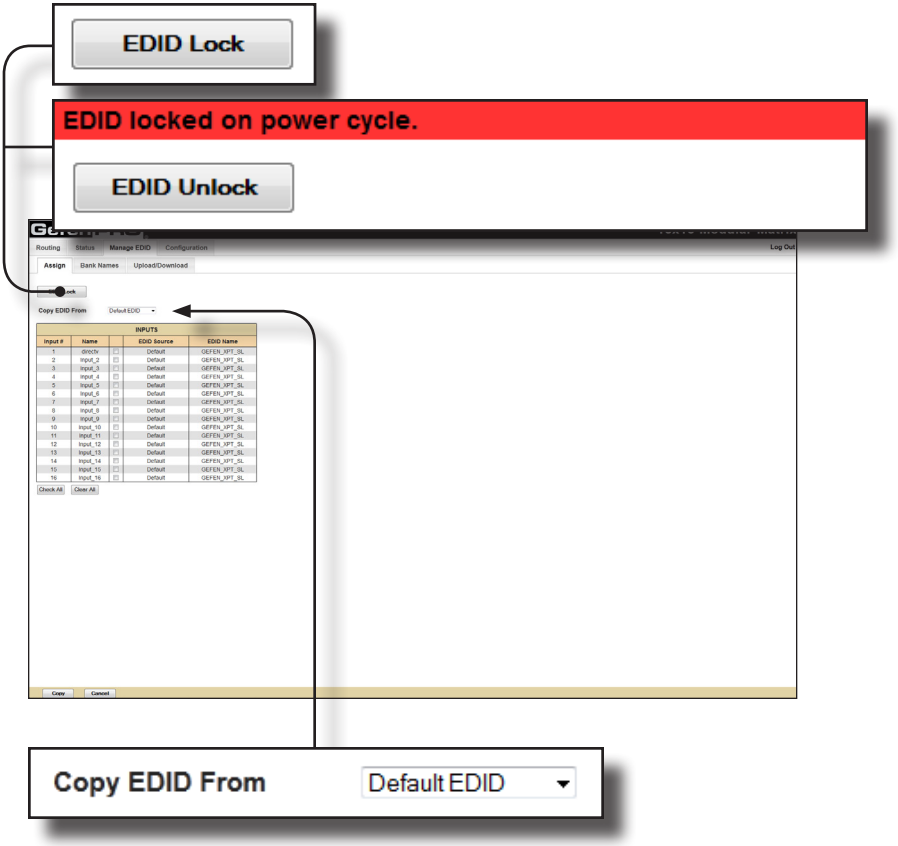
BACKPLANE	
S/N	981125
F/W Ver	0.04.05
MSTemp	36 C deg
PTemp	36 C deg
Power 3.3v	3338 mv
Power 5.0v	5072 mv
Core Power	1222 mv
IO Power	0 mv
Fans1	OFF
Fans2	OFF
Fans3	OFF

CONTROL BOARD	
S/N	953535
F/W Ver	0.04.13
Temp	26 C deg
Power	1851 mv
PSU1	3058 mv
PSU2	0 mv
Serial	RS232

Manage EDID ► Assign

Lock EDID
Secures the Local EDID and disables the automatic loading after power-up. See the `#lock_edid` command for more information.

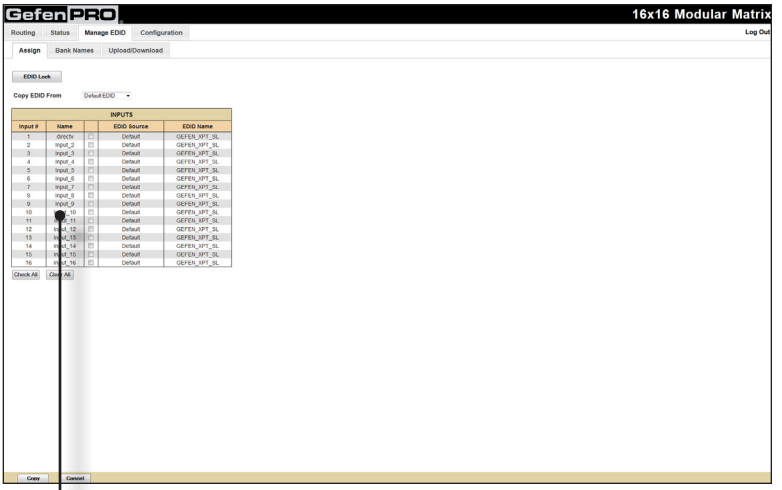
If the Lock EDID button is clicked (enabled), the "EDID locked on power cycle" message will be displayed in red. The local EDID information will now be locked once the matrix is rebooted. Click the Unlock EDID button to disable the Lock EDID feature.



Copy EDID From
Select the EDID from the drop-down list. The EDID will be copied from the selected destination to the desired input or EDID bank.

Options:
Default EDID, Bank 1 ... Bank 8, Output 1 ... Output 16

(continued on next page)



Input #	Name	
1	directv	☐
2	Input_2	☐
3	Input_3	☐
4	Input_4	☐
5	Input_5	☐
6	Input_6	☐
7	Input_7	☐
8	Input_8	☐
9	Input_9	☐
10	Input_10	☐
11	Input_11	☐
12	Input_12	☐
13	Input_13	☐
14	Input_14	☐
15	Input_15	☐
16	Input_16	☐

Check All Clear All

Input #
Indicates the number of each input.

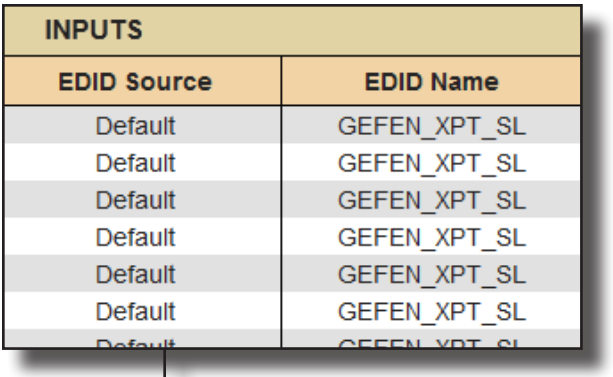
Name
The current name assigned to each input. The name of each input can be assigned using the Web interface or by using the #name command.

Checkbox
Click to select the Input(s) to where the EDID source will be copied. Selecting an input does *not* automatically copy the EDID source. Click the **Copy** button to copy the EDID to the input.

Check All
Places a check mark in all boxes.

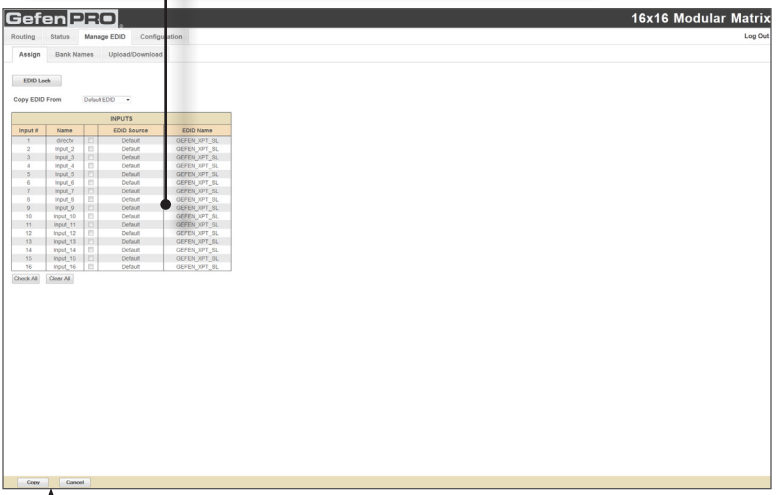
Clear All
Clears all check marks.

Click to select the desired input(s).



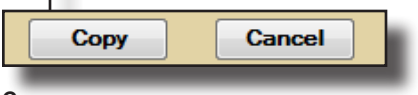
INPUTS

EDID Source	EDID Name
Default	GEFEN_XPT_SL
Default	GEFEN_XPT_SL
Default	GEFEN_XPT_SL
Default	GEFEN_XPT_SL
Default	GEFEN_XPT_SL
Default	GEFEN_XPT_SL
Default	GEFEN_XPT_SL



EDID Source
Displays the EDID source used by the input. In the illustration above, the EDID source is Output 1.

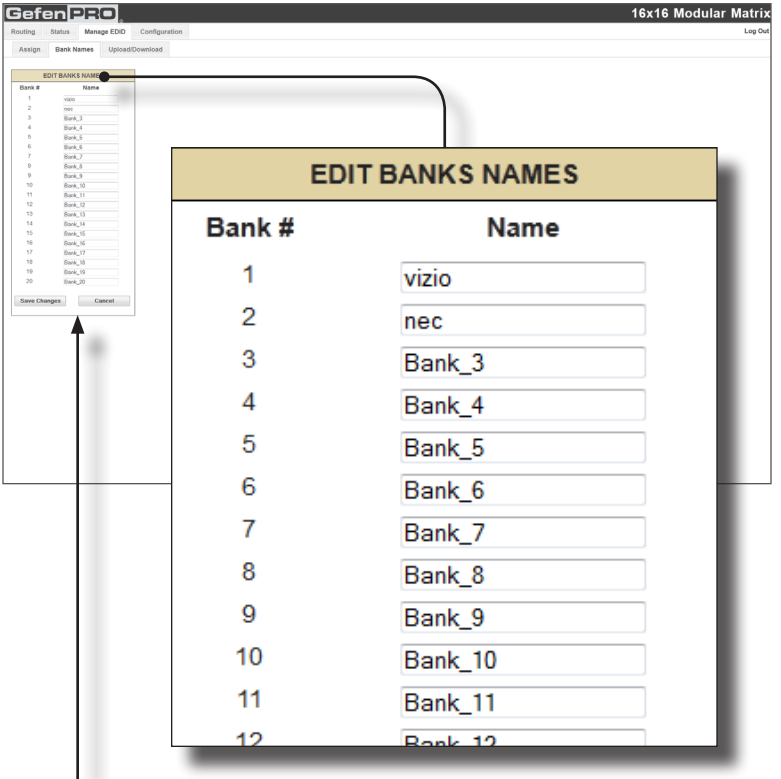
EDID Name
Displays the name of the current EDID being used on the input.



Copy
Copies the EDID source to the selected input(s).

Cancel
Clears all check marks from each box.

Manage EDID ► Bank Names



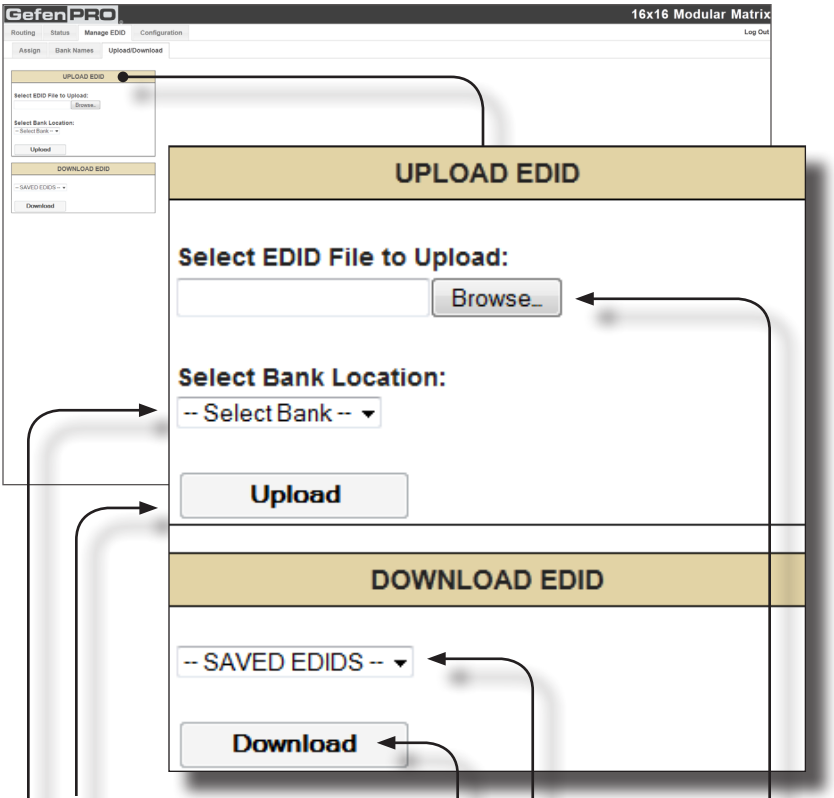
Bank #
Indicates the EDID bank number.

Name
Type the desired name of the EDID bank in this field.
Click the **Save Changes** button to save the bank name.
Click the Cancel button to restore the previous name.

Save Changes
Saves the current name change to the EDID bank(s).

Cancel
Restores the previous names for each EDID bank, if a change was made.

Manage EDID ► Upload / Download



Upload
Click this button to upload the EDID to the specified bank.

Browse...
Click this button to select the EDID file to be uploaded.

Select Bank
Click this drop-down list to select the bank to where the EDID will be uploaded.

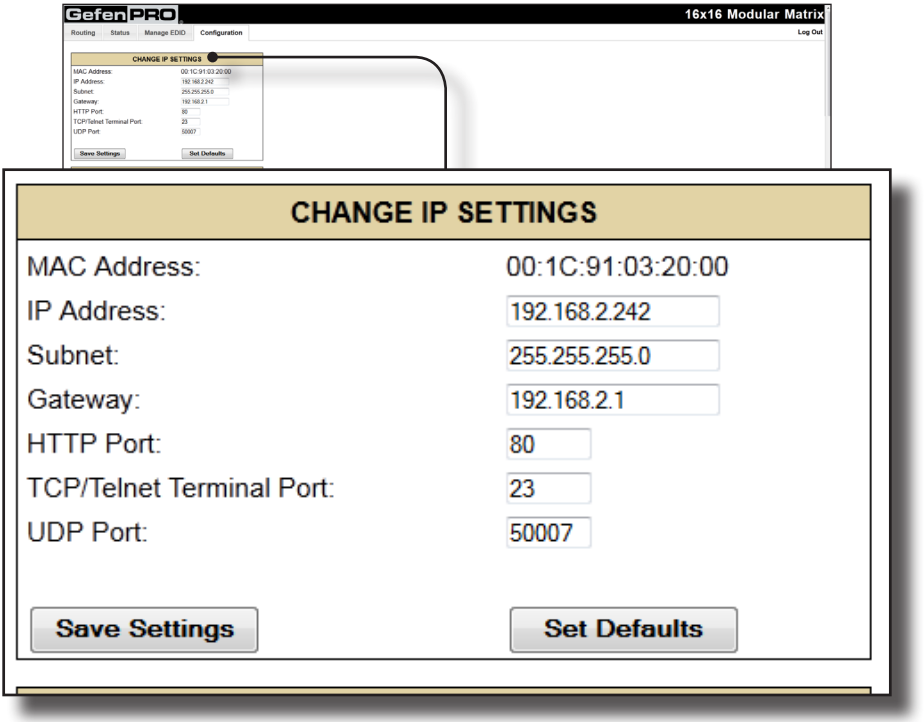
Options:
Bank_1 ... Bank_20

SAVED EDIDS
Click this box to select the EDID that is to be saved to a file. The EDID file will be saved in binary format (.bin).

Options:
Bank_1 ... Bank_20,
Output_1 ... Output_16,
Input_1 ... Input_16

Download
Click this button to download the selected EDID to a file.

Configuration ► Change IP Settings

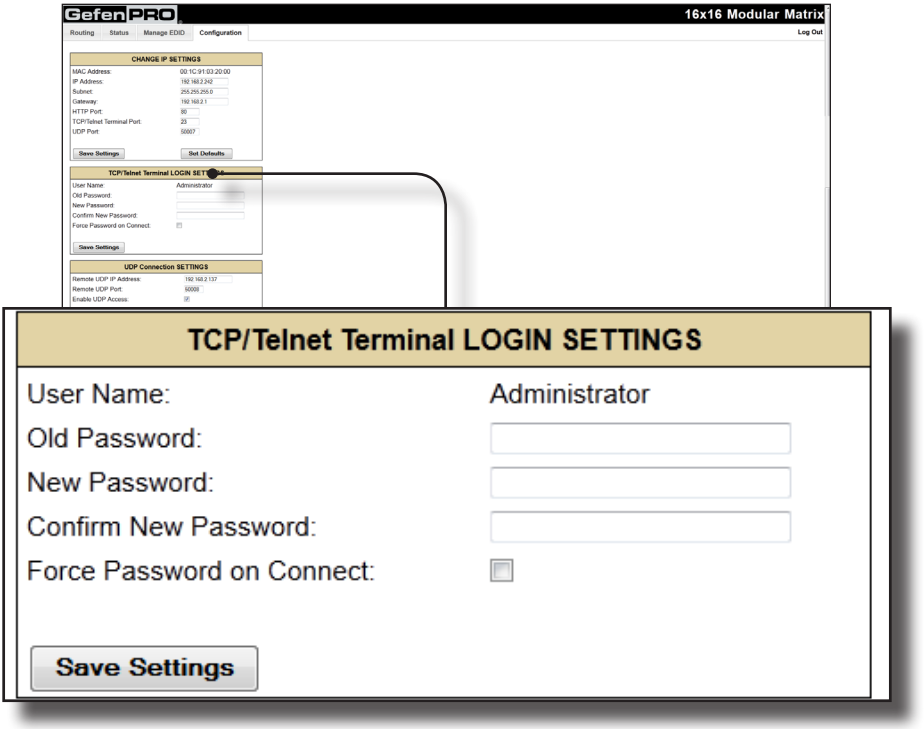


Change IP Settings
Assigns the IP address, subnet, gateway, HTTP listening port, Telnet port, and UDP port. The MAC address cannot be changed.

Save Settings
Saves the current settings for the Change IP Settings. After clicking this button, the Web interface will display a dialog indicating that the matrix must be rebooted for changes to take effect.

Set Defaults
Click this button to restore the factory-default IP settings. After clicking this button, the Web interface will display a dialog indicating that the matrix must be rebooted for changes to take effect.

Configuration ► TCP / Telnet Terminal Login Settings



Old Password
Type the current (old) password in this field.

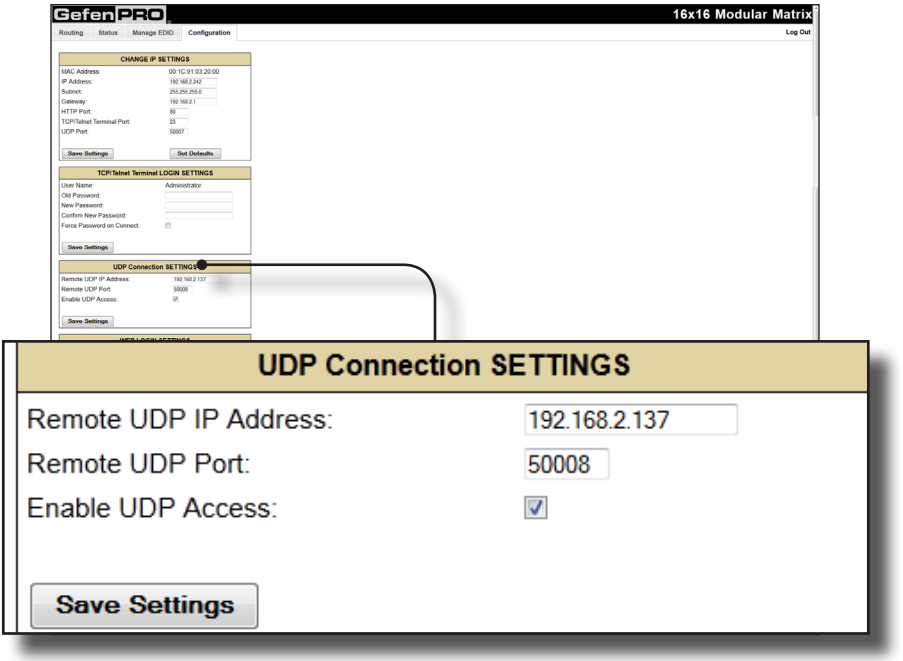
New Password
Type the new password in this field.

Force Password on Connect
Click this check box to have the matrix prompt for a password each time a Telnet session is started.

Show Login Message on Connect
Click this check box to have the matrix display the Telnet welcome message each time a Telnet session is started. The welcome message appears as: "Welcome to GEF-MOD-16416 TELNET"

Save Settings
Saves the current changes to the Telnet Login Settings.

Configuration ► UDP Connection Settings

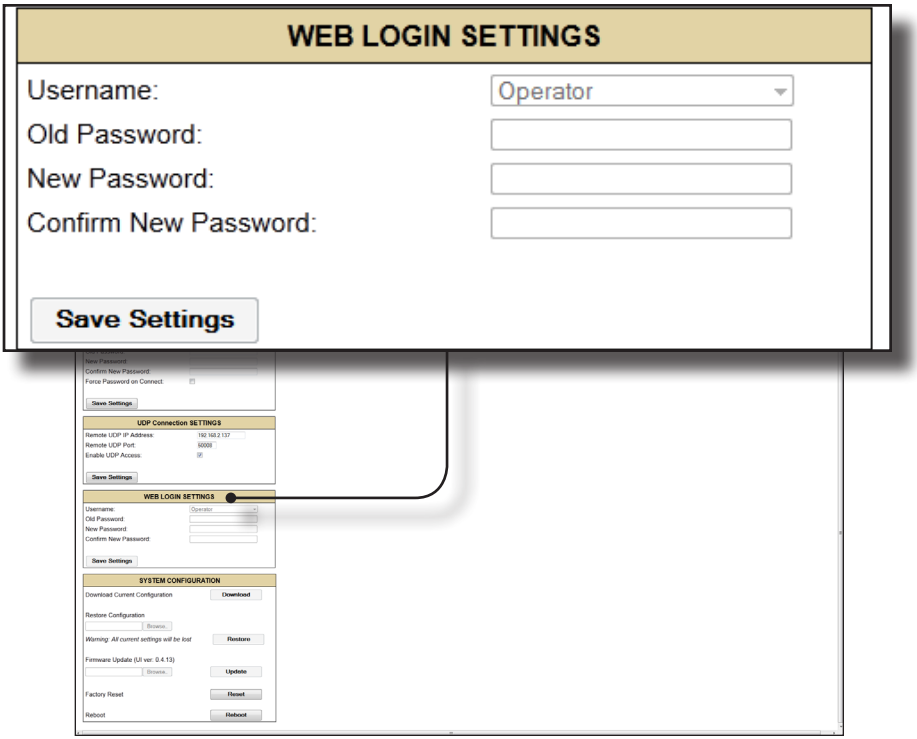


Remote UDP IP Address
Type the remote UDP IP address in this text box.

Remote UDP Port
Enter the remote UDP port in this text box.

Enable UDP Access
Check this box to enable UDP access. If this box is unchecked, the UDP access will be unavailable.

Configuration ► Web Login Settings



Username
Click this drop-down list to select the username to be changed.

Old Password
Type the current (old) password in this field.

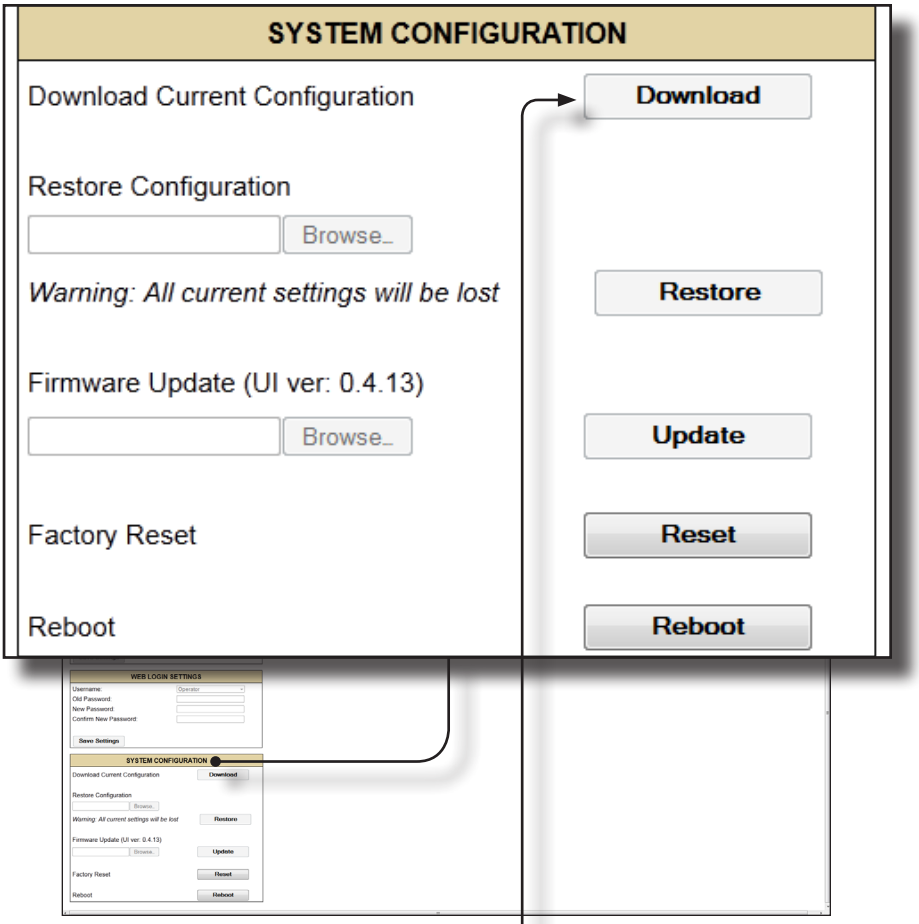
New Password
Type the new password in this field.

Confirm Password
Re-type the new password in this field.

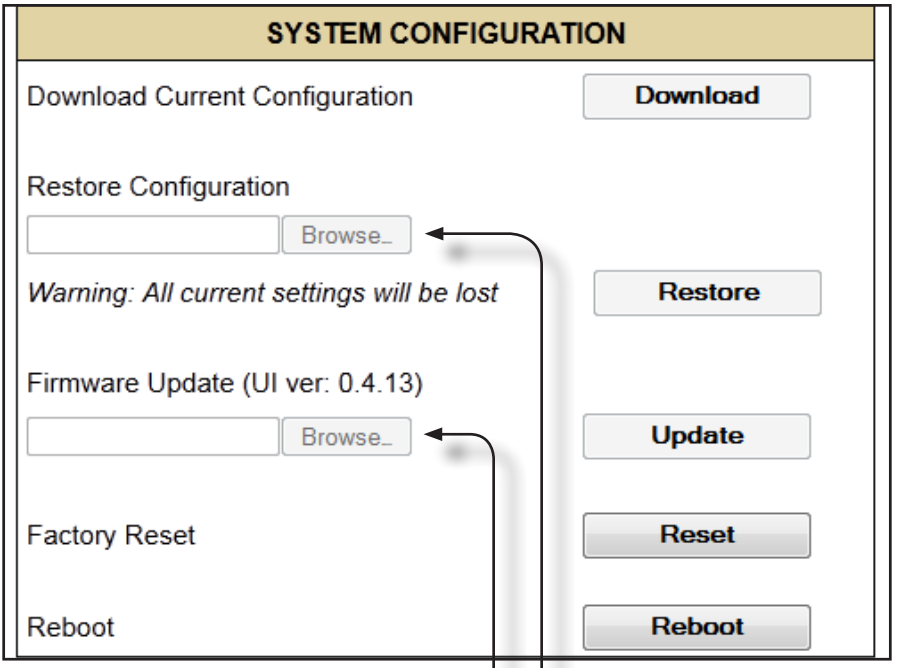
Save Settings
Saves the current changes to the Web Login Settings.

Configuration ► System Configuration

NOTE: As of this writing, the firmware upgrade procedure is not functional from within the Web interface. This feature will be available in a future release of the product. The firmware upgrade procedure must be performed using RS-232. See the Firmware Upgrade Procedure for instructions on upgrading the firmware.



Download Current Configuration
Click this button to download the current configuration to a file.



Browse
Click this button to select the firmware file to be uploaded. See the Firmware Upgrade Procedure for instructions on upgrading the firmware

Browse
Click this button to select the saved configuration file to be loaded into memory.

Restore
Uploads the selected configuration file to the matrix.

Update
Updates the matrix with the selected firmware file.

Reset
Click this button to set the matrix to factory-default settings. The IP settings are preserved.

Reboot
Click this button to reboot the matrix.

16 SOURCES x 16 DISPLAYS | Modular Matrix

04 Appendix

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- Modular Matrix 8 DisplayPort Input Card 126
- Modular Matrix 8 ELR Input Card 126
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- Modular Matrix 8 DVI Output Card 128
- Modular Matrix 8 ELR Output Card 128
- DVI ELR Receiver with POL 129
- Modular Matrix 8 FO Output Card 129
- DVI Receiver over 1 FO 129

Card Removal and Installation

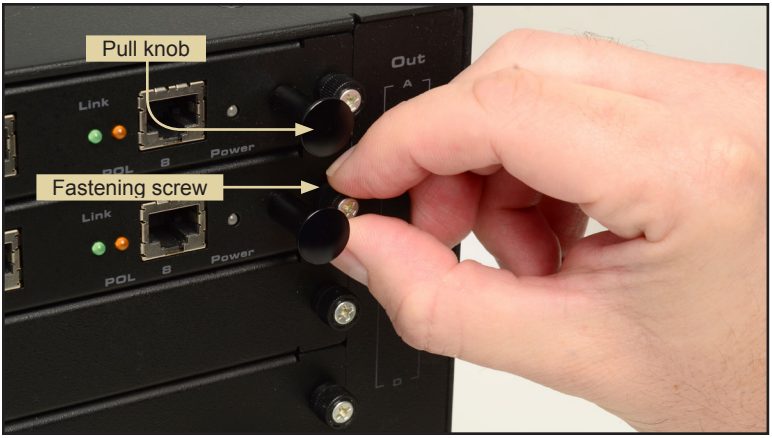
Although each *16x16 Modular Matrix* is sold pre-configured, both input and output cards can be removed or added to fit the needs of the application. Each module can easily be removed and installed without using any special tools.

> **WARNING:** Modules are sensitive to Electrostatic Discharge (ESD) which can damage the module. Avoid touching the module contacts or the components on the module. Always hold modules by the edges or by the knobs on the front of the module. Never slide a module over any surface. When installing/replacing modules, do not install an input module in to an output slot or an output module to an input slot. This will damage the matrix and void the warranty.

1. Power-off the matrix.
2. Turn the matrix around so that you are facing the back of the unit.

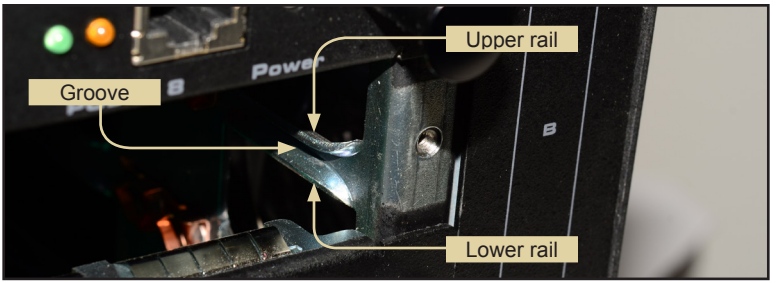
> **STOP:** Before installing modules and prevent the risk of possible electrical shock, unplug the AC power cord from back of the matrix.

3. Loosen the fastening screws on both sides of the card (or cover plate) to be removed. Each card / cover plate has two fastening screws.

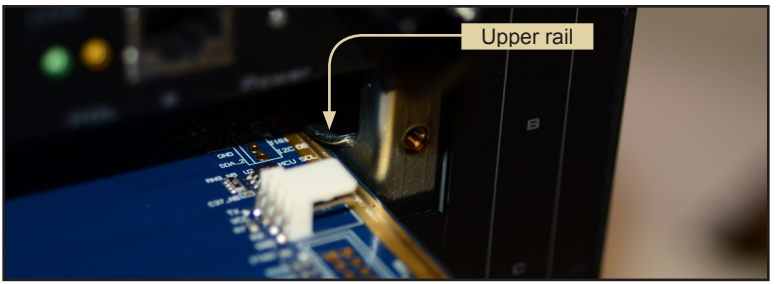


4. Grab the knobs on both sides of the card, between the thumb and index finger, and gently pull to remove the card from the matrix, as shown on the next page. If a cover plate is being removed, then loosen the fastening screws on both sides of the cover plate and gently remove the cover plate.

5. Locate the grooved metal track on either side of the expansion bay.



6. Carefully position the card between the upper and lower rail on each track and slowly push the card forward.



7. Position either hand on both sides of the matrix and firmly push the card with both thumbs until it snaps in place (*32x32 Modular Matrix* shown).

8. Secure the card by hand-tightening the fastening screws. Do not overtighten the screws. To prevent damage to the screws, do not use pliers or other high-torque devices.

Firmware Upgrade Procedure

The following items are required to update firmware:

- GefenPRO 16x16 Modular Matrix
- Computer running Windows XP
- Terminal-emulation program (e.g. HyperTerminal)
- RS-232 cable (do not use a null-modem cable)
- Firmware files: MMTX_BP_[version].bin,
  MMTX_DVIinout_[version].bin,
  MMTX_UI_[version].bin

To begin the update procedure use the `#fw_update` command. The following set of instructions will be using Hyperterminal.

1. Power-on the matrix.
2. Connect an RS-232 cable to the PC and open the terminal program. See RS-232 and IP Configuration for configuration information.
3. Type the command: `#fw_update`.
4. The following will be displayed on the terminal screen:

```
==============================
 Download new FW_____1
 cancel_____________0
==============================
```

5. Press the '1' on the computer keyboard to select `Download new FW`.

   The following will be displayed:

```
Please send new FW bin file
Waiting for the file to be sent ... (press 'a' to abort)
```

6. In Hyperterminal, click `Transfer --> Send File...`
7. Select the firmware file: `MMTX_BP_e_[version].bin`
8. Select YModem from the Protocol drop-down list.
9. Click the OK button.

   The firmware update procedure will begin. This process should take a couple of minutes and will update the back panel boards. After the firmware update is successful, the following will be displayed in the terminal program.

The firmware update procedure will begin. This process should take a couple of minutes and will update the back panel boards. After the firmware update is successful, the following will be displayed in the terminal program:

```
Verify Check sum, please wait

Download Completed Successfully!
MMTX_BP_e_0_3_43.bin
 Size: 50688      Bytes
Activate boot loader for BP board
Please wait..............The system will reboot itself, please
wait
..
**********************
 GEFEN
 Modular MultiMatrix
 UI FW version: 0.3.38
**********************
Establish connection with Input Board 1
  Board Type: DP input 8 channels
  Board SN: 959800
  FW ver:0.3.8
Establish connection with Input Board 2
  Board Type: DP input 8 channels
  Board SN: 959793
  FW ver:0.3.8
Establish connection with Input Board 3
  Board Type: DVI input 8 channels
  Board SN: 954849
  FW ver:0.3.8
Establish connection with Input Board 4
  Board Type: DVI input 8 channels
  Board SN: 954759
  FW ver:0.3.8
Establish connection with Output Board 1
  Board Type: FO output 8 channels
  Board SN: 981708
  FW ver:0.3.8
            ...
            ...
            ...
Establish connection with BP Board
  Board Type: BP 32
  Board SN: 953703
  FW ver:0.3.43

Init Routing, Please wait
.......
Loading default EDID to all locals Inputs, please wait.........
Finished Loading
```

10. Repeat steps 3 through 9 using the `MMTX_DVIinout_[version].bin` file. The update process for the Input / Output boards may take several minutes. After the update process is complete, the following will be displayed in the terminal window:

```
Verify Check sum, please wait
Download Completed Successfully!
MMTX_DVIinout_e_0_3_8.bin
 Size: 68640      Bytes
Activate boot loader for all IN/OUT boards
Please wait.....................................................
.....................................................................
.....................................................................
.....................................................................
.....................................................................
.............................
Finished loading new FW version to all IN/OUT boards
The system will reboot itself, please wait

**********************
 GEFEN
 Modular MultiMatrix
 UI FW version: 0.3.38
**********************

Establish connection with Input Board 1
  Board Type: DP input 8 channels
  Board SN: 959800
  FW ver:0.3.8
Establish connection with Input Board 2
  Board Type: DP input 8 channels
  Board SN: 959793
  FW ver:0.3.8
Establish connection with Input Board 3
  Board Type: DVI input 8 channels
  Board SN: 954849
            ...
            ...
            ...
Establish connection with BP Board
  Board Type: BP 32
  Board SN: 953703
  FW ver:0.3.43

Init Routing, Please wait
.......
Loading default EDID to all locals Inputs, please wait.........
Finished Loading
```

11. Finally, repeat steps 3 through 9 using the `MMTX_UI_[version].bin` file. This file updates the Web UI. This file is relatively large and this process may take several minutes. After the update process is complete, the following will be displayed in the terminal window:

```
Verify Check sum, please wait

Download Completed Successfully!
MMTX_UI_e_0_3_38.bin
 Size: 498240     Bytes
Activate boot loader for UI board
Please wait...
================================================
==          Gefen MMTX Boot Loader            ==
==               v 3.7                        ==
================================================

Checking program CS in SPI flash, Please wait
.................................................
 Erasing internal FLASH, please wait ...
 Writing internal FLASH, please wait ............................
.....................
Download Completed Successfully!

***********************
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Establish connection with Input Board 1
  Board Type: DP input 8 channels
  Board SN: 959800
  FW ver:0.3.8
Establish connection with Input Board 2
  Board Type: DP input 8 channels
  Board SN: 959793
            ...
            ...
Establish connection with BP Board
  Board Type: BP 32
  Board SN: 953703
  FW ver:0.3.43

Init Routing, Please wait
.......
Loading default EDID to all locals Inputs, please wait.........
Finished Loading
```

12. The firmware update process is complete.

Specifications

Supported Formats	
Resolutions (max.)	• 1920 x 1200 (WUXGA) • 1080p Full HD

Electrical	
Maximum Pixel Clock	• 165 MHz
Input Video Signal	• 1.2V p-p

Connectors	
Inputs (16 x max.) (organized into banks of 8, depending upon the type of input card used)	• 8 x DVI-I, 29-pin, female (digital only) • 8 x DisplayPort, female • 8 x ELR-POL, RJ-45 • 8 x Fiber, SC-type
Outputs (16 x max.) (organized into banks of 8, depending upon the type of input card used)	• DVI-I, 29-pin, female (digital only) • ELR-POL, RJ-45 • Fiber, SC-type
RS-232	• 1 x DB-9, female
Ethernet	• RJ-45 (100BaseT)

Operational	
Power Input	• 2 x 100 - 240V AC
Power Consumption	• 650W (each power supply)

Physical	
Dimensions (W x H x D)	• 17.5” x 7” x 15” (443mm x 178mm x 381mm)
Net Weight	• 18 lbs (8.16 kg)

Modular Matrix 8 DVI Input Card

GEF-MOD-848DVI-I	
Maximum Pixel Clock	• 165 MHz
Input Connectors	• 8 x DVI, 29-pin, female (digital only)
Power Indicator	• 1 x LED, blue
Dimensions (W x H x D)	• 15.75” x 1” x 10.5” (400mm x 26mm x 267mm)
Unit weight	• 2 lbs (0.9 kg)

Modular Matrix 8 DisplayPort Input Card

GEF-MOD-8DP-I	
Output Data Rate	• 2.7 Gbps (TMDS)
Input Video Signal	• 1.2V p-p
Input Connectors	• 8 x DisplayPort, 20-pin, female
Dimensions (W x H x D)	• 15.75” x 1” x 10.5” (400mm x 26mm x 267mm)
Unit weight	• 2 lbs (0.9 kg)

Modular Matrix 8 ELR Input Card

GEF-MOD-8ELRPOL-R	
Maximum Pixel Clock	• 165 MHz
Video Input Connector	• 1 x DVI-I, 29-pin, female (digital only)
ELR Connector	• 1 x RJ-45, female
Dimensions (W x H x D)	• 4.3” x 3.4” x 1.1” (110mm x 85mm x 28mm)
Unit weight	• 1.4 lbs (0.64 kg)

DVI ELR Sender with POL

GEF-DVI-ELRPOL-S	
Maximum Pixel Clock	• 165 MHz
ELR Connectors	• 8 x RJ-45, female
Power Indicator	• 1 x LED, blue
Link Indicators	• 8 x LED, green
POL Indicators	• 8 x LED, red
Dimensions (W x H x D)	• 15.75” x 1” x 10.5” (400mm x 26mm x 267mm)
Unit weight	• 2 lbs (0.9 kg)

Modular Matrix 8 FO Input Card

GEF-MOD-8FO-R	
Maximum Pixel Clock	• 165 MHz
Fiber Optic Connectors	• 1 x SC-type, per input (8 total)
Dimensions (W x H x D)	• 15.75” x 1” x 10.5” (400mm x 26mm x 267mm)
Unit weight	• 2 lbs (0.9 kg)

DVI Sender over 1 FO

GEF-DVI-1FO-S	
Video Input Connector	• 1 x DVI-I, 29-pin, female (digital only)
Fiber Optic Connectors	• SC-type
Power Supply	• 1 x 5V DC, locking
Power Consumption	• 10W (max.)
Dimensions (W x H x D)	• 4.3” x 3.4” x 1.1” (110mm x 85mm x 28mm)
Unit weight	• 1.4 lbs (0.64 kg)

Modular Matrix 8 DVI Output Card

GEF-MOD-8DVI-O	
Maximum Pixel Clock	• 165 MHz
Output Connectors	• 8 x DVI, 29-pin, female (digital only)
Power Indicator	• 1 x LED, blue
Dimensions (W x H x D)	• 15.75” x 1” x 10.5” (400mm x 26mm x 267mm)
Unit weight	• 2 lbs (0.9 kg)

Modular Matrix 8 ELR Output Card

GEF-DVI-8ELR-S	
Maximum Pixel Clock	• 165 MHz
ELR Connectors	• 8 x RJ-45, female
Dimensions (W x H x D)	• 15.75” x 1” x 10.5” (400mm x 26mm x 267mm)
Unit weight	• 2 lbs (0.9 kg)

DVI ELR Receiver with POL

GEF-DVI-ELRPOL-R	
Maximum Pixel Clock	• 165 MHz
Video Output Connector	• 1 x DVI, 29-pin, female (digital only)
ELR Connector	• 1 x RJ-45, shielded
Dimensions (W x H x D)	• 4.3” x 3.4” x 1.1” (110mm x 85mm x 28mm)
Unit weight	• 1.4 lbs (0.64 kg)

Modular Matrix 8 FO Output Card

GEF-DVI-8FO-S	
Maximum Pixel Clock	• 165 MHz
Fiber Optic Connectors	• 1 x SC-type, per input (8 total)
Dimensions (W x H x D)	• 15.75” x 1” x 10.5” (400mm x 26mm x 267mm)
Unit weight	• 2 lbs (0.9 kg)

DVI Receiver over 1 FO

GEF-DVI-1FO-R	
Maximum Pixel Clock	• 165 MHz
Video Output Connector	• 1 x DVI, 29-pin, female (digital only)
Fiber Optic Connector	• 1 x SC-type
Power Supply	• 5V DC, locking
Power Consumption	• 10W (max.)
Dimensions (W x H x D)	• 4.3” x 3.4” x 1.1” (110mm x 85mm x 28mm)
Unit weight	• 1.4 lbs (0.64 kg)

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